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ABSTRACT

This document consists of one volume year (four quarterly issues) of the journal "HyperNexus," containing articles on hypermedia and multimedia use in education. Typical article topics are: language-learning software; teaching and learning HyperCard; hypermedia-based teacher education; the use of music in virtual reality; integrating LinkWay into the social studies curriculum; authoring systems and constructivist learning; multimedia design issues; and the cognitive impact of interactivity. Columns include editorials, hardware and software updates and reviews, and Internet news. (BEW)

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Hyper Nexus

Journal of Hypermedia and Multimedia Studies

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STUDENT HYPERMEDIA PROJECTS

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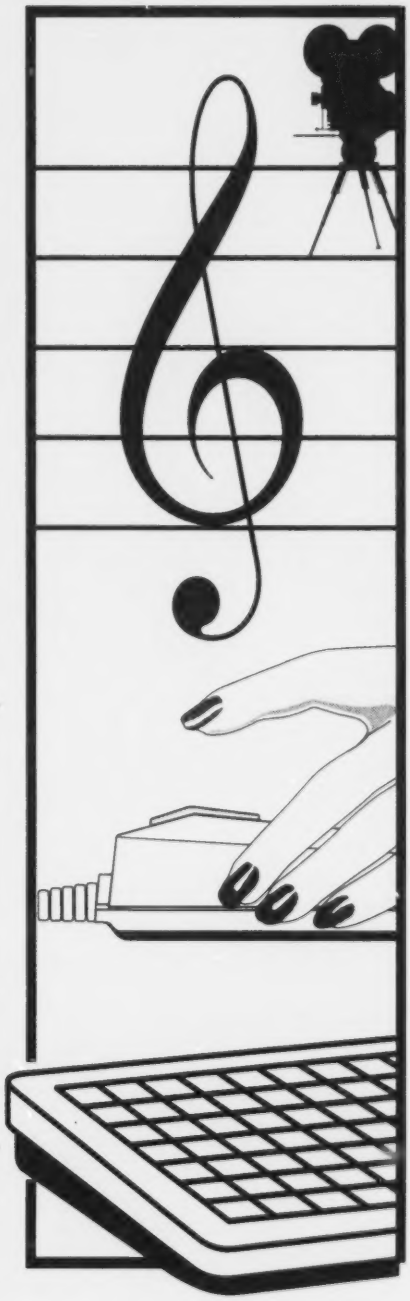

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In This Issue

Trudy Abramson

You may correctly sense a "time warp" as you read through this issue. Last summer, I agreed to come aboard as Co-Editor. Shortly thereafter, I was appointed Editor by ISTE for the volume beginning Fall 1995. During that time, Volume 5 became suspended somewhere in cyberspace until it landed on my desk several weeks ago. Jodie Rogers at ISTE, Paola Williams, SIG Chair, and I have been working closely to make up for lost time. We decided to combine the four issues due this year into two that will appear in very close proximity to one another.

Between the time I was appointed to be Co-Editor and the time I discovered my tenure was beginning prematurely, I was appointed Professor, School of Computer and Information Sciences, Nova Southeastern University. My primary teaching responsibility is courseware design and development in an online doctoral program. This is a very exciting and challenging opportunity, one that fits our SIG mission perfectly.

This is the journal of the Special Interest Group in Hypermedia/Multimedia. This is *your* journal. I have accepted the editorship, with the blessing of my Dean, in the hope of making this a valuable, viable avenue for widespread sharing of experience and expertise. I anticipate having the next volume appear with a full editorial board and an expanded call for participation. If you have sent articles to *HyperNexus*, whether or not they have been acknowledged, please send me E-mail containing complete mail, phone and fax data and article titles. If you believe you are on the editorial board, or would like to be on it, please send me a one-page vita with your contact information.

This issue begins with a farewell from Annette Lamb. Note that she, also, has changed her academic affiliation. Next is a greetings from me, and following that is a message from Paola Williams, SIG Chair.

Bruce D. Campbell describes the evolution and pilot implementation of a secondary level multimedia program, *Black Belt*, that supports the mastery of foreign languages.

Lisa Rozich-Klingbiel and Beth A. Scholten develop and execute a project in which fourth grade students write and illustrate their projects using *HyperStudio*.

Cathy Sanders provides a highly graphic description of HyperKit, a program she developed as a means of helping adults master *HyperCard*.

Paola Williams contributes an Internet News feature that supplies valuable information for all of us. Internet becomes even more exciting with the expanding World Wide Web graphical interfaces on the net. Attention, SIG members, the net is increasingly a hypermedia avenue.

Trudy Abramson introduces a series of articles that feature practical classroom applications of hypermedia. This issue features a *HyperCard* tutorial featuring Jan Borda and Saundra Josipowich that might be used for inservice training.

James R. Tucker, Jr. and James J. McCluskey contribute a article on virtual reality and music.

Mike Williams shares a case study review of *SimCity 2000*, a simulation in which the user becomes the planner and mayor of a city.

Enjoy!

A Word from the Editor

Annette Lamb

Moving On

As many of you are aware, I've been the editor of *HyperNEXUS* since its premier issue. I've enjoyed both editing the journal and writing articles, but it's time to move on to other activities. I'll continue to assist with development of the journal, and I'll occasionally write articles and columns. However, Trudy Abramson has agreed to take over the primary role of editing the journal.

I'm shifting my focus from journal writing to book writing (topics including multimedia, hypermedia, the Internet, and anything new and exciting...) and video production. I just finished four videos on the topics of *HyperCard*, *HyperStudio*, CD-ROM, and the Internet. I am always looking for practical examples and ideas, so I'd love to continue to hear from you and would be happy to work with you on article ideas.

Lamb's Laws of Technology

I'd like to end my tenure as senior editor with a fun top ten list you can post on your office door.

#10 Networks only go down at the time you need them most.
#9 Once you get the hang of a system, it will change.
#8 Four-year-olds learn software faster than forty-year-olds.
#7 You only lose files when you don't have a backup.
#6 Your screen only freezes when you haven't saved.
#5 You only run out of memory when you're really in a hurry.
#4 Sixth graders always find the online smut.
#3 Even a gazillion-meg hard drive isn't big enough for kids.
#2 The Internet resource you tested the night before will always be jammed during school hours.
#1 Technology books (or journals?!) are guaranteed to be outdated the day you get them...but that's life in the Information Age!

I'd like to thank all the authors and reviewers who volunteered their time to the journal over the years. Keep up the great work!

***Annette Lamb**, University of Southern Indiana, Dept. of Teacher Education FA144, 8600 University Blvd., Evansville, IN 47712; Phone: 812/465-7148; e-mail: aclamb.ucs@smtp. usi.edu.*

A Message from the Chair

Paola Williams

Aloha from Hawaii...

School is well underway, and in fact, summer is something that happened long ago. The warm weather with no trade winds is all that remains of a warm Hawaiian summer!

I had great fun putting together the Internet article you will find in this issue. I also enjoyed scouting the town for interesting happenings in the worlds of multimedia, hypermedia, and virtual reality. I was amazed to find such richness of technology development and use among my own community. I hope you enjoy all the articles in this issue, and that you might want to go out and scout your educational community and share it with all your *HyperNexus* buddies in the next issue!

Please keep us posted about what you find and what you are doing in your teaching, learning, and sharing with your colleagues.

Mahalo,

***Paola Williams.** Punahou School, Honolulu, Hawaii, 96825; e-mail: pwilliam@uhunix.uhcc.hawaii.edu.*

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Greetings from the Co-Editor

Trudy Abramson

Happy to Come Aboard

It is with great pleasure that I accept the co-editorship of *HyperNexus*. Annette Lamb has established a standard of excellence in bringing a state-of-the-art perspective on hypermedia and multimedia to the HyperSIG membership. Our goals are greater member involvement and professional growth through sharing of experiences. These goals can be met only with everyone's full participation and cooperation. Share your journal with your colleagues, recruit new members for HyperSIG and ISTE, and use *HyperNexus* as the vehicle to let everyone know what you are doing to enhance teaching and learning with hypermedia and multimedia resources.

A Thumbnail Sketch

Many of our readers know me through the *LinkWay* workshops I conduct across the country, the articles I publish, or the graduate learning technology courses I teach. A seasoned classroom teacher and educational consultant, I became involved with different aspects of computer education at the college and post-baccalaureate levels seventeen years ago. My doctorate in communications, computing, and technology in education was earned at Teachers College, Columbia University in 1985. Since that time, I have designed, developed, and taught in educational technology graduate programs and served as information technologies consultant to school systems, business, and industry.

Improving Education

In the late 1970s, it appeared that structured computer languages could provide a conceptual framework for teaching logic, organization, and problem solving. However, school systems were unwilling or unable to provide the resources to train the nation's teachers in the use of these language tools. A decade later, interactive multimedia for education had reached the marketplace. Notable offerings included *PALS* (Principles of Alphabetic Literacy System), a PC videodisk-based program for adult non-readers (Abramson, 1989, 1990a), and *The Writing Express*, a CD-ROM-based communications package for primary grades that used television-quality images and sound to teach communications skills (Abramson, 1990b). At about the same time, *HyperCard* for the Mac and *LinkWay* for the PC were introduced as hypermedia authoring tools for learners. These development tools were much easier to master than were their high-level language ancestors and, coupled with their ability to control multiple media devices, they easily produced multisensory output. It became clear to me that multimedia and hypermedia in learning were the wave of the future; I determined to ride the crest and to take my graduate students along for the ride (Abramson, 1992, 1993, 1994, 1995).

Technology has given us the tools to restructure teaching and learning for the Communications Age; we must work together to learn to use these tools to their best advantage. Applications such as word processors, spreadsheets, databases, and communications packages are basic tools; hypermedia and multimedia are enhancement tools. Technology-supported cooperative and collaborative learning, constructivist learning, and authentic assessment are efforts that are moving us closer to appropriately preparing the citizenry of the future.

An Appeal for Reader Interaction

It appears that many of our dedicated readers are reluctant to commit their work to print. Let us begin with a Letters feature. Write to me, or to *HyperNexus* in care of ISTE. Feel free to agree or to disagree with the journal articles. If an article touches on your expertise or experience, build on it. Use E-mail or snail-mail (formerly known as the U.S. postal system).

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The Development of Black Belt: a Global Language-Learning Software Program

Bruce D. Campbell

Last year I developed *Black Belt*, a global language-learning software program capable of supporting many languages. Using a puzzle-game format that requires problem solving and competition, *Black Belt* offers the foreign-language teacher a supplemental tool that is an entertaining and effective way for students to memorize foreign scripts.

As a first offering, I have developed complete modules for Hiragana, Katagana, and the first three of nine levels of Kanji for Japanese language learners. (Hiragana and Katagana are Japanese phonetic alphabets used in conjunction with Kanji, a semantic-based character script.) Although the environment supports many languages, *Black Belt* is particularly useful for symbol-based languages with different scripts.

Background

The idea for *Black Belt* originated in a Honolulu-based high-tech incubator where my multimedia company, Rising Wave Inc., is based. There, I witnessed sleep-deprived entrepreneurs taking frequent breaks to play a tile-matching computer game called Shanghai. For the players, the game soon became an obsession: it was relaxing, addictive, and fostered a competitive spirit.

Foreign-language students need a similarly intriguing game to rekindle their excitement in learning, according to Dr. John Wollstein, the former foreign-language coordinator for the Hawaii Department of Education. (Wollstein is currently president of Teleclass International, a non-profit organization dedicated to promoting foreign-language acquisition via telecommunications.) According to Wollstein, drop-out rates for foreign-language students are often as high as 85 percent. Multimedia-based instruction, however, has proved an effective method for combating student apathy. According to a study by UC-Fullerton and IBM, multimedia-based instruction can increase learning outcomes by one half of a letter grade. Language learning games, in particular, have proved an effective learning tool for students studying foreign languages. One study focusing on a Kanji game found students who learned the Kanji names indirectly via the computer remembered significantly more than the students who learned directly using the more traditional pencil and paper strategy (CALL Journal, "Hypermedia as Facilitator for Retention," v. 7, no. 1, pp. 3-7).

Development

Last March, I put together a team of experts and created *Black Belt*, a tile-matching game that would appeal to students of all ages. I used *HyperCard* to develop a black-and-white prototype of *Black Belt* for Japanese-language learners. *HyperCard* was the programming language of choice because it operates on the lowest common denominator computer, an important consideration since many schools still have older computer models with limited multimedia and color capabilities. The team used interesting graphics, animation, and visual recognition reinforced with aural pronunciation by a native Japanese speaker. Tropical scenes from Hawaii form the backdrop for the graphic screens.

Since the initial beta testing was very successful, it was obvious that I would need a cross-platform version of *Black Belt*. Consequently, I am developing a color version of *Black Belt* using *SuperCard*, a cross-platform authoring system. *SuperCard* allows me to develop one version of *Black Belt* that will operate on both Intel machines running Windows and the Apple Macintosh. The color version also allows for superior graphics and, therefore, better symbol recognition. Apple's *World Script* Japanese language kit was used to write the Kanji characters.

The first modules of *Black Belt* challenge students to master nine levels of the Japanese Kanji, about 1,125 Kanji. Based on a metaphorical "martial arts school for the mind," set in the mythical land of "Laǹg Tu," students must beat their opponent, "IGNORANCE," by matching the Kanji with their correct graphic representation. In playing the game, the tile with a picture of a mountain must be matched with the correct Kanji character for mountain. Students are guided in their mission by their teacher, or, following the Japanese, Sensei. When a match is made, the correct pronunciation is voiced; then, the student is encouraged to imitate the correct pronunciation. This aural component, integrated with the visual recognition, imitates natural language acquisition.

Each level consists of 16 puzzles comprised of thematic groupings of eight Kanji/picture pairs. For example, the puzzle for the category Nature I would include Kanji characters for fire, water, river, mountain, sun, flower, tree, and rain. A puzzle is completed when the student correctly matches all the Kanji with their correct graphical symbol. Students can choose to first play the game in a learning mode before going on to the timed challenge mode. When students beat the game in challenge mode, they are ready to choose another puzzle. The student meets the Sensei for a final challenge after winning all 16 puzzles; then, random Kanji from each of the 16 puzzles are presented by the Sensei and must be matched by the student to confirm their mastery. Upon completion of the final challenge, the teacher presents the student with the next level belt. *Black Belt* players thus move from the White Belt level through the colors of the rainbow until ultimately they achieve a Black Belt.

Groupings of Kanji

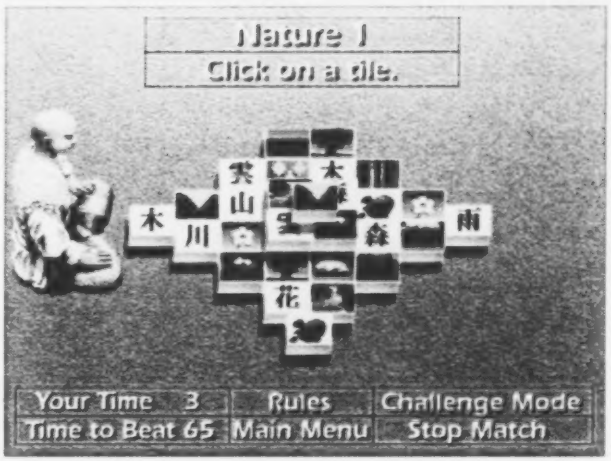
The traditional method of teaching the Kanji in Japan is to break them down into first-year and second-year characters based on the difficulty of writing the character. Because the characters learned in the first year may not be useful in real-life situations, students often do not have enough knowledge of the language to function outside of the classroom. Junko Lowrey, a Japanese language teacher at Kamehameha Schools in Hono-

lulu and a consultant for the *Black Belt* Japanese program, remedies this situation by teaching Japanese through the use of realistic situations and real language.

"Given a situation, can the student get the task done?" Lowrey asked. "For instance, if the student goes shopping, he or she must have the skills to purchase something. That would involve learning the Kanji appropriate for that situation."

With this goal in mind, students are asked to role play rather than to memorize dialogues. They learn by doing. At the same time, students are taught to read, write, speak, and listen, Lowrey said.

The Kanji in *Black Belt* are grouped in a similar way. For instance, the first set of Kanji allows the players to introduce themselves and include information about their schools, their teachers, their home, etc. Future versions of *Black Belt* will include situations where the students must use their newly acquired knowledge of the Kanji to accomplish a task given them by their Sensei.



Teacher and Student Response

The *HyperCard* black-and-white prototype of *Black Belt* was tested for a period of several weeks in two classrooms at two large private schools in Hawaii. About 50 students were studying Japanese; the others were enrolled in a computer education course.

Overall, the response from students and teachers at both schools was very positive. Students enjoyed using the program and quickly learned the Kanji featured in the program. Some of the comments made were as follows:

- "The graphic designs were exceptionally nice and the scenery makes it look lifelike."
- "The opening had a lot of deep thoughts along with soothing hypnotic music."
- "The learning mode is very easy to read and it is also easy to understand. It makes the game a lot easier after you have done it."
- "The challenge mode is fun because you put your skills to work. You can challenge friends. You can also try to better yourself on quickness and knowledge."
- "The game is good, challenging, and fun."
- "The learning stage teaches you well and is a good way to develop the Kanji when seeing the symbol. Helps in remembering the symbol and what they mean."

Perhaps the best testimony comes from Yuriko Tcheou, the Japanese language teacher who tested *Black Belt* in her classroom at Hawaii Baptist Academy. She writes, "The Hawaii Baptist Academy Japanese language students were very excited when introduced to the *Black Belt* program. They love using *Black Belt* better than they like doing any of the other class activities. Because of this, most of them know all of the Kanji that the *Black Belt* program features and are waiting for a more advanced type of Kanji in the continuation of the existing *Black Belt* program. I noticed even after the first attempt at the program, my students' recognition of the characters were noticeably faster. *Black Belt* is an excellent educational program, and I would like to encourage you to continue to persevere at the making of the continuation to the program."

Digital Communications

Rising Wave Inc. will provide connections for *Black Belt* students worldwide through a service provided over Internet. American and Japanese classrooms will be linked through Internet's E-mail capabilities, and students will be able to exchange messages written in Japanese. In effect, American students can become electronic pen pals with their Japanese counterparts and practice their Japanese in a real-time situation.

For those classrooms that do not have access to the Internet, a printed directory will be available containing information on classrooms interested in exchanging letters.

For further information on *Black Belt*, please contact Bruce Campbell.

Bruce Campbell *is at Rising Wave Inc., 1103 9th Avenue, Suite 255, Honolulu, HI 96816. Phone: (808) 739-5917. FAX: (808) 733-2011. You may also contact Bruce via E-mail at rwave@aloha.com, where Rising Wave's Internet signature is "Come surf our wave!"*

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Journey Through the Solar System

Lisa Rozich-Klingbiel
Beth A. Scholten

Introduction

Finding that spark to ignite our fourth grade science students to write and illustrate their own reports proved to be both challenging and exciting for the children and ourselves. With *HyperStudio*, our students were able to write, illustrate, and formally present concepts related to the solar system. Multimedia software provided a method by which students could construct knowledge and extend their learning. The students welcomed the freedom of enhancing their text with the technology.by creating stacks which represented their understandings. The stacks were then presented to a real audience, the students and teachers, providing for a *Journey Through the Solar System*. Implementing this project took approximately four weeks, and could be easily adapted for use in grades two through five.

Project Plan

Technology Objectives

- Utilize the various components of the program *HyperStudio* (sound, links, clip art, drawing tools, text fields, video clips).
- Create a linear presentation stack that can be easily viewed.
- Plan a concept map to organize all individual HyperStudio stacks.
- Design and construct a "front-end" stack based on the concept map to link to individual stacks.

Research Objectives

- Research the topic using multiple sources.
- Work individually to become an expert on a topic.
- Organize their facts into a meaningful presentation.
- Present information in a manner that is personally relevant to students and engaging and informative to a real audience.
- Respond to question about their area of study.

Science Objectives

- Compare the Earth to other planets in terms of supporting life.
- Compare and contrast our planet, sun, and moon to other planet and star systems.
- Describe the motion of the Earth and Moon around the Sun.
- Describe how scientists learn about our universe.
  (Many other outcomes are met based on the students' areas of expertise).

Procedures

- Teacher creates *HyperStudio* stack, focusing on one topic area related to the solar system (See Figure 1).
- Teacher presents their topic through the use of the premade *HyperStudio* stack.
- Students share prior knowledge and select topics related to the Solar System theme (e.g., planets, comets, satellites, constellations, the moon).
- Students work on individual projects, researching using multiple resources.
- Students organize their research using index cards, representing each individual card in their stack.
- Students create individual *HyperStudio* stacks, using their index cards (See Figures 2,3,4).
  1. Create cards and buttons (links between cards).
  2. Write text on each card.
  3. Illustrate each card (using clip art, videos, drawing tools).
  4. Add sounds to each card.

- Students present learning to class by sharing stack on TV / VCR.
- Students share learned concepts with the class, and answer questions.
- Class connects ideas (stack topics) into a concept map.
- Stacks are then organized to coincide with the concept map (See Figure 5).
- Students videotape their individual stack to preserve as a keepsake (Optional—see sidebar for procedures).

Materials

- Multimedia software (*HyperStudio*)
- 5 x 8 Index cards
- Various sources on topics (e.g., encyclopedias, dictionaries, science texts, non fiction information books, magazine articles, CD-ROMs, pictures, and video clips)
- Stereo mixer (Radio Shack)
- Microphone
- VCR
- Television
- Scan converter (CV Link or L-TV) and cables

Results

The *Journey Through the Solar System* project provided for enhanced attainment of the desired outcomes. Student knowledge was evident in their individual stacks and as the class constructed a meaningful concept map, extending and connecting their ideas. The students felt ownership toward their newly constructed knowledge. Students exceeded expectations for the projects, when compared with previous work, largely due to the integration of the technology.

Self-esteem was enhanced as each learner became an expert on his or her topic area. Furthermore, students saw one another

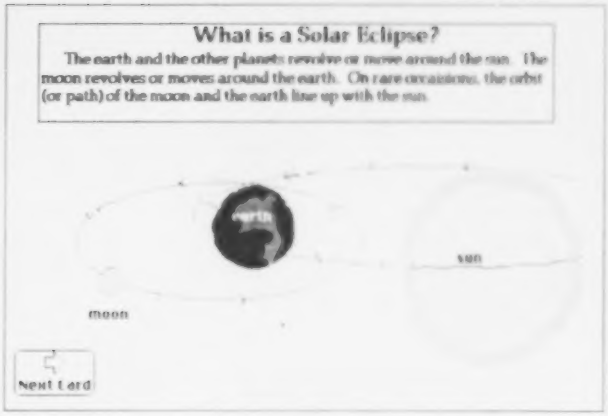
What is a Solar Eclipse?
The earth and the other planets revolve or move around the sun. The moon revolves or moves around the earth. On rare occasions, the orbit (or path) of the moon and the earth line up with the sun.
earth
sun
moon
Next Card

Figure 1.

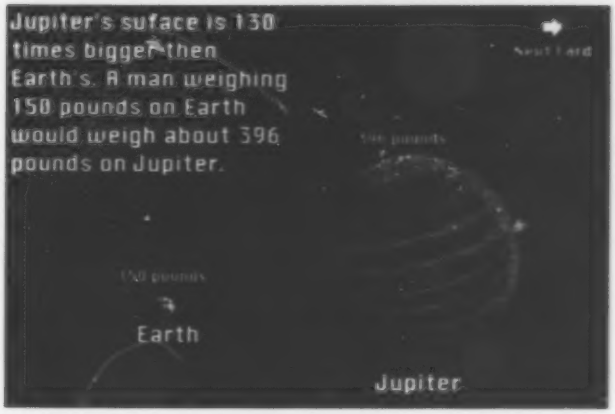
Jupiter's suface is 130 times bigger then Earth's. A man weighing 150 pounds on Earth would weigh about 396 pounds on Jupiter.
Next Card
Earth
Jupiter

Figure 2.

as having valuable contributions to offer. With the use of the VCR, students could videotape their stacks and also celebrate this learning with their families.

Assessment of student understanding was triangulated by their stacks, oral presentations, and answers to questions. Naive understandings (See Figure 4) which could be missed in written or oral only reports were made evident by the multiple representations of text, graphics, and spoken word.

Other Ideas

This project could be adapted easily to other subject areas. One example in mathematics is to create a class conjecture book which links to individual students' stacks explaining their conjectures related to procedures or concepts. In writing the class could compile an anthology of poetry. Students comfortable with the technology side of this project might also try projects such as writing tall tale stories or illustrating wordless picture books.

Advice

In rethinking this project, we feel the following issues may be helpful to consider:

- Students should have completely planned their stacks on index cards before beginning to use *HyperStudio*. Then they will have completely thought through their ideas before using the computer.
- Teachers and students should conference together to revise and edit the index cards.
- The use of original illustrations, versus clip art, made for better presentations. Illustrating the text required the students to "show" their understandings.
- It may be useful to use the KWL strategy at the beginning of the unit.
- We feel that students need to have background knowledge of the technology being used, prior to initiating the project. Learning science and technology simultaneously could be overwhelming.

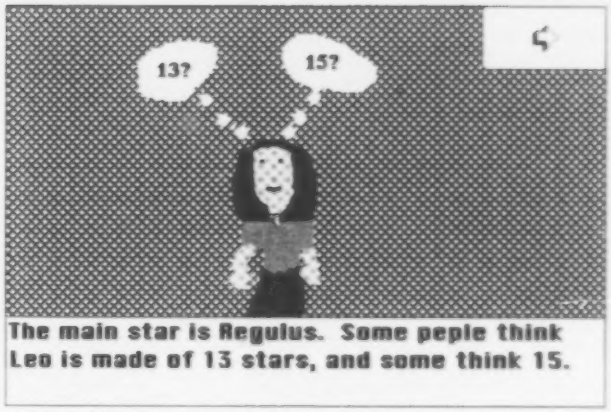

Figure 3.

Figure 4.

**KWL is a strategy designed to help young students begin and organize searches for information.*

The K is know. *What do I know about the subject?*
The W is want. *What do I want to learn about the subject?*
The L is learn. *What have I learned about the subject?*

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- **via telephone**
  Use our Administration number for ISTE organizational business. Our toll-free Customer Service number is for membership/product information and ordering.

  Administration: 503/346-4414
  Customer Service: 800/336-5191

- **via fax**
  If you prefer to fax, use our Administrative or Customer Service fax numbers. Request fax documents from our fax-on-demand service. See our latest Resource Guide for a full listing.

  Administrative Fax: 503/346-5890
  Customer Service Fax: 503/302-3778
  Fax-On-Demand: 800/891-0212

- **via e-mail**
  If you have e-mail access, send questions or comments to one of our convenient e-mail addresses and your message will be forwarded to the appropriate staff member. America Online customers should look at the Forum for Technology in Education & Training; AppleLink users can find ISTE information in the K-12 Education/Resources/Associations area.

  America Online: ISTE
  AppleLink: ISTE
  CompuServe: 70014,2117
  Internet: iste@oregon.uoregon.edu

- **via gopher or world wide web**
  If you have an Internet connection that allows you to use Gopher or World Wide Web software, visit our educational technology information collections on the Internet.

  Gopher:
  iste-gopher.uoregon.edu:70

  World Wide Web:
  http://iste-gopher.uoregon.edu:80

ACCESS ISTE

Effective November 1, 1995, ISTE's Area Code will be 541.

VIDEOTAPING HYPERSTUDIO STACKS

Equipment: HyperStudio software, stereo-mixer, microphone, VCR, television, scan converter, and cables.

Recording steps:

- Connect scan converter to computer and VCR (video in jack).
- Connect microphone to stereo mixer and stereo mixer to VCR (audio in jack).
- Turn on computer, stereo mixer, scan-converter, VCR, and TV.
- Open a student's *HyperStudio* stack and check to see that it is displayed on the TV monitor.
- Check to make sure that the audio from the microphone plays through the TV.
- Insert videotape and begin recording.
- Read text into microphone while navigating the stack.
- Share finished stack with friends and family.

***Lisa Rozich - Klingbiel** is a co-teacher at Elliott Elementary, a Michigan State Professional Development School. Lisa teaches science for Beth Scholten while Beth participates in other projects. Lisa focused on the science unit, research skills, and stack planning. **Beth A. Scholten** is a fourth grade teacher at Elliott Elementary. Beth focused on the stack creation in the computer lab. They can be contacted at Elliott Elementary, 4200 Bond, Holt, MI 48842*

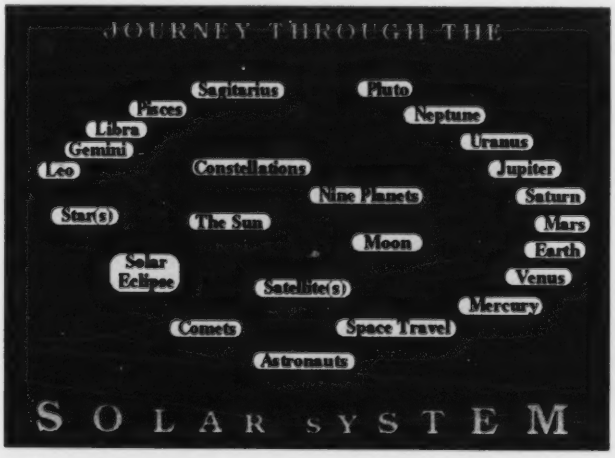


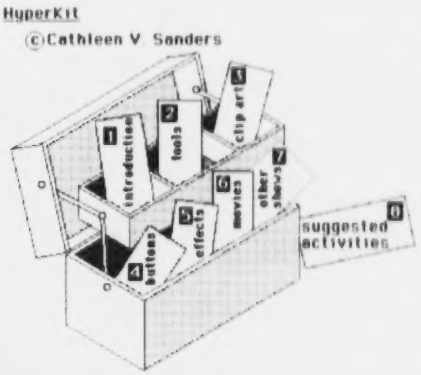
Figure 5.

My HyperKids: Learning and Teaching HyperCard

Cathi Sanders

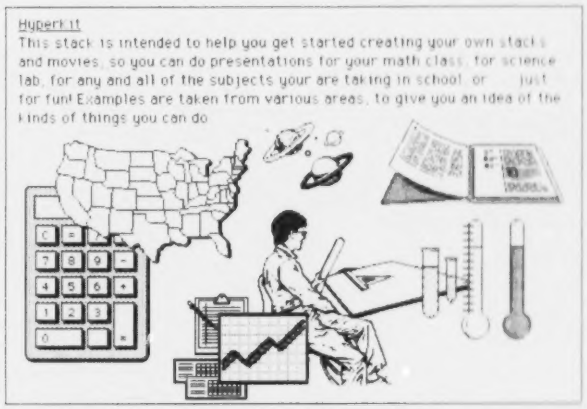
A few years ago, when I decided I wanted to learn *HyperCard*, I couldn't find a class that taught it to adults! I've produced 16mm films and filmstrips, and *HyperCard* seemed to me to be a great way to combine many different media in a quick and versatile format. When I bought the program, a book came with it which offered some tutorials in text form. They were O.K., as far as they went, but they really didn't teach me how to use *HyperCard* and how to make it do what I wanted it to do. The books barely touched on scripting and buttons. With some help from people that I met, I did begin to figure out how to put *HyperCard* to my own uses. Along the way, I decided that a good way to learn *HyperCard* would be to plunge right in and create a project in *HyperCard*. And so I created HyperKit.

HyperKit is an interactive *HyperCard* tutorial designed to enable people with little or no previous experience to create their own *HyperCard* presentations. It includes a toolkit of ideas, buttons and templates that users can copy and paste into their own presentations, and a collection of examples of the kinds of "movies" or "shows" that can be can created in *HyperCard*. HyperKit also contains a set of suggested activities and ideas to inspire creative presentations.



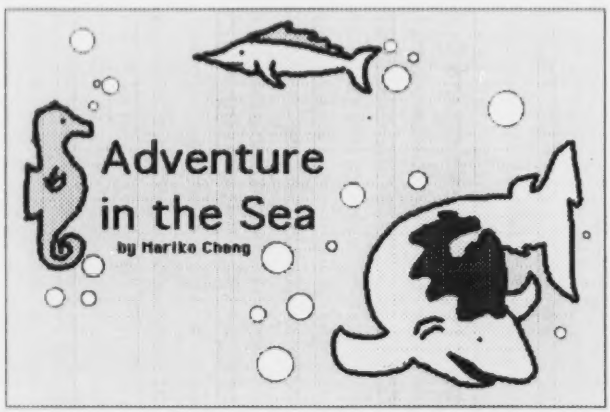
Most *HyperCard* stacks are written for use at the Browsing level, which is for reading and learning from the cards. HyperKit was written for use at the Authoring level. Users have access to all of the tools, and use them to experiment with the tutorial stack and to create their own *HyperCard* stacks.

As a teacher, I am excited about the creative possibilities of *HyperCard*. The real educational power of the computer for students is not just in seeing someone else's presentations, however information-rich those presentations might be, but in designing and creating their own presentations. We all learn best when we teach someone else, and by empowering students with the tools to create their own educational presentations, we create the opportunity (and the motivation) for them to learn both the medium (the computer) and the message (the educational content).

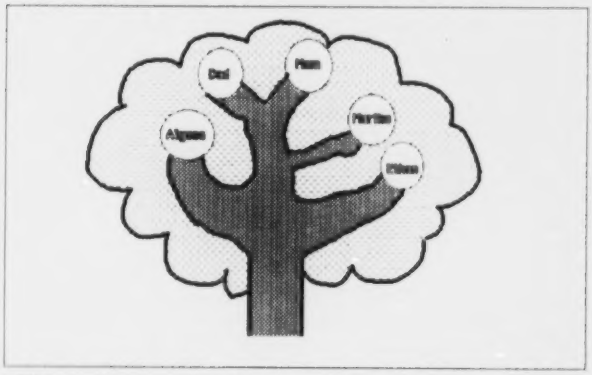

HyperKit
This stack is intended to help you get started creating your own stacks and movies, so you can do presentations for your math class, for science lab, for any and all of the subjects your are taking in school, or just for fun! Examples are taken from various areas, to give you an idea of the kinds of things you can do.

HyperKit is intended for use by high school students, to enable them to create presentations on subjects related to their school work in math, science, history and other classes. It could be used equally well by adults, and I have used it to teach children as young as 1st grade.

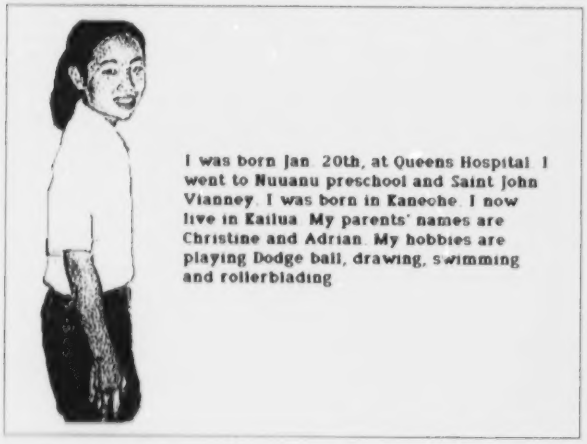
This summer I taught *HyperCard* to students who had just completed 4th and 5th grade. Most had no previous experience with *HyperCard*, though all had some small amount of experience on the Macintosh. These boys and girls, ranging in age from 9 to 11, used HyperKit to learn how to use the paint tools, how to script in *HyperCard*, and as a guide to the possibilities for *HyperCard* projects. They were immediately enthusiastic about the creative possibilities of the software, and dove right in to create animations, branching stacks with wonderful graphics, intriguing and amusing stories, and creative sound effects.



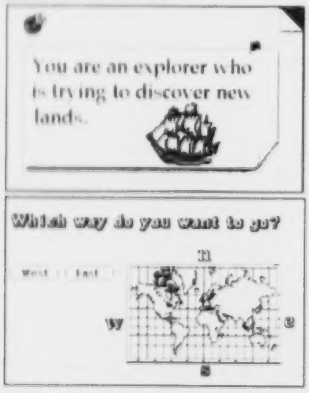
The first project they did was a 10-card animation, using their own graphics, clip art, scanned-in graphics, or a combination of these. They then spent a week working on a family tree.

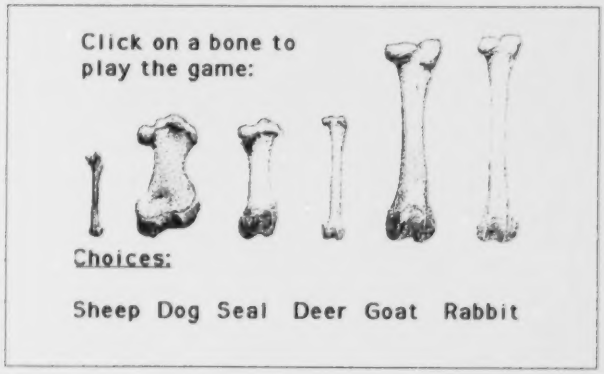


The students used scripts to navigate through a branching stack with family photos and other creative graphic additions.


I was born Jan. 20th, at Queens Hospital. I went to Nuuanu preschool and Saint John Vianney. I was born in Kaneohe. I now live in Kailua. My parents' names are Christine and Adrian. My hobbies are playing Dodge ball, drawing, swimming and rollerblading.

The third, and most popular project, was a *HyperCard* "Choose your Own Adventure" story, complete with sound effects, many alternate endings, special effects, and some wild plots! They used HyperKit throughout the creative process, as a reference and a source for scripts, buttons, graphics and The final project of this 6-week, 2-hour per day class was a research project on a topic of their own choosing. Skeletons, Japan, and pandas were some of the many choices.





I was amazed and amused by the creativity these kids displayed in their graphics, storylines and sound effects. They seemed to feel right at home on the computer, and to learn *HyperCard* very quickly and without any hesitation. It is a natural extension of their enthusiasm, their culture and their creativity.

I would be glad to share ideas, information, and my HyperKit tutorial stack with anyone who is interested in learning or teaching *HyperCard*. I can be contacted through Punahou School. *HyperCard* is such a fascinating program, and the possibilities for educational use are limitless!

Internet News

Paola Williams

Introduction

By now the school year has begun, and even that wonderful three-day weekend in early September seems like something in the distant past. Welcome to the school year and all the wonderful learning in store for your students, your colleagues, and YOU!

I hope you found the summer issue full of helpful information that you can put to good use. We hope to keep you informed about the latest and best that is available to you as an educator on the Internet.

Interest by classroom teachers in the Internet has grown exponentially, and just keeping up seems almost impossible. The articles in this column will be a distillation of what is going on in the educational area, particularly in multimedia, hypermedia and virtual reality. Since the Internet itself is all of the above, I will include information about the Internet. We are all still trying to figure out what this wonderful thing is, and how to use it for our own personal growth and to help our students be better learners.

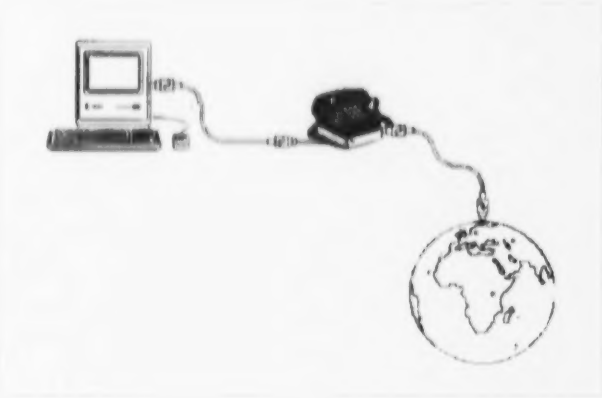
Many new and exciting groups have formed on the net in the last few months. Many of these deal with both educational applications and professional development. I'll list some of the ones I've come across while lurking around.

Listservs

LISTSERV lists are electronic discussions that are supported by a software program called LISTSERV. Electronic discussions are interesting and often informative, since they can help you locate other professionals with a similar interest. Be aware that once you subscribe to a list, you open your mail box to dozens of messages circulated by the various lists you have joined. Of course, you may unsubscribe anytime you want. Here are some ideas:

- Listserver@nsf.gov
  subscribe STSSUM-L (Your Name) NSF Publications by e-mail
- listserv@jhuvm.hcf.jcu.edu
  subscribe to Grants-L
- listserv@wuvmd.wustl.edu
  ACSOFT-L educational software discussion
- ai-ed-request@sun.com
  AI-ED artificial intelligence in education
- listserv@bingvmb.cc.binghamton.edu
  EDUCAL-L discussion of artificial intelligence in education
  MEDIA-L discussion of media in education
- listserv@vmtecmex.bitnet
  MMEDIA-L multimedia education discussion.

Here are four more lists you may join. I found these gems in *Net Guide*, by Michael Wolff (Random House).



- Generation X istproc@phantom.com (subscribe gen-x (your name)
- Music listserv@pccvm.bitnet (subscribe all music (your name)
- Star Trek listserv@strek-l (your name)
- Games listserv@brownvm.brown.edu (subscribe games-l (your name)

Electronic Journals

Electronic journals are also on the rise across the Internet. Many are repeats of what you may already get through the lists you subscribe. Others are popping up very fast. An example of a few:

- Cyberwire Dispatch. E-mail to majordomo@cyberwerks.com; body: subscribe cwd-l.
- EFFECTOR, the Electronic Frontier Foundation's membership newsletter. E-mail to brown@eff.org; body: subscribe EFFECTOR
- NetTeach News appears monthly August through March and bimonthly April through July. It is published in both paper and electronic ASCII versions. E-Mail : info@netteach.chaos.com, editor Kathy Rutkowski, kmr@chaos.com. The sneak preview issue I saw was very informative and had good articles covering a wide range of topics.

Not quite a journal but a new addition to the net is an online vendor, "Superstore on the Internet." Computer Express, an online retailer of computer software and hardware products, announced the grand opening of its Internet superstore. To receive further information, send E-mail to info@cexpress.com, gopher cexpress.com 2600, or visit URL http://cexpress.com:2700.

New Web Sites

Dozens of new WWW sites are opening. Many are tied to educational applications, and others are attempts to get into the medium early. Like anything new, some are outstanding and others will fall by the wayside. Some of the new ones you may judge for yourself.

Beginning on August 25th, Apple has been offering information through a World Wide Web (WWW) site on the Internet called The Apple Support and Information Web. You can find it at http://www.info.apple.com. This is the premier Internet site for product information, technical information and free of charge Apple software updates. This site combines multiple Apple Internet services into a single easy to use graphically oriented information medium.

Another interesting find related to the World Wide Web is a WWW Starter Kit. EIT announced a freeware over-the-web service for downloading, installing, and customizing a Web server. The Webmaster's Starter Kit uses forms to get basic configuration information, and writes your configuration files for you as you download the software. Check out http://wsk.eit.com/wsk/doc, or just find the link near the end of EIT's home page, http://www.eit.com.

Education On Line is a WWW site out of Brown University. The URL is http://netspace.cis.brown.edu.80/eosi/main_image.html.

Another wonderful research space is the gopher for Northwestern Regional Lab. The address is gopher.nwrel.org. There's lots of good stuff here for teachers and those doing research in education.

Educational Projects Over the Internet

Kidlink is a grassroots organization that has over 7,000 children in more than 45 countries participating in global dialogues. It has been in existence only a few years. The work is organized in 12-month projects. KIDLINK's purpose is the dialogue itself. There are no political objectives. All children in all countries between the age of 10-15 are invited. Participation is free, but the children have to reply to the following four questions before being allowed to join the dialogue with other children:

1) Who am I?
2) What do I want to be when I grow up?
3) How do I want the world to be better when I grow up?
4) What can I do now to make this happen?

KIDLINK projects appear regularly in the listserv for KIDSPHERE.

The GLOBE project is an international effort based on the writings of Vice President Al Gore in "Earth in the Balance." It aims to build an international collaboration of data collection and analysis projects on environmental data. GLOBE management are soliciting expressions of interest in collaboration by nonprofit organizations already involved in environmental education or environmental science activities. Although the deadline has passed for submitting proposals, many listservs are following this project and reporting the status of the project as it progresses.

The Global SchoolNet Foundation has many projects running simultaneously. A recent listing on the Internet described the following project: "The Global SchoolNet Foundation and Microtac Software present FAMILIES WRITE—A U.N. International Year of the Family Project." This unique global Internet project will utilize Microtac's Language Assistant translation software to permit students who speak English, Spanish, French, Italian, and German to join this project and write in their native language. The purpose of the project is to conduct meaningful correspondence among students who do not speak one another's native languages, and develop international, intercultural, and intergenerational dialogue, understanding, and appreciation. It is hoped that this will improve native language skills in reading and composition and help to discover and identify the strategies and skills teachers and students need in order to conduct multilingual collaborative learning projects. For more information, contact families@bonita.cerf.fred.org.

Thoughts about the Internet for Educators

Recently, I was asked to do a small workshop about the Internet for educators. In preparing an introduction, I really ended up with a vision statement about how the Internet has evolved into a meeting place for educators to discuss and debate. In conclusion, here are some thoughts on that issue.

"Think of the computer, not as a tool, but as a medium" is an opening statement by computer visionary Brenda Laurel. Her vision is one in which technologies offer new opportunities for creative, interactive experiences and, in particular, for new forms of drama. According to Laurel, we should think about interactive computing in terms of two things: an application and an interface. Her definition is clear; application provides specific functionality for specific goals, and an interface represents that functionality to people. The interface is the thing that we communicate with—the thing we "talk" to—the thing that mediates between us and the inner workings of the machine.

Here then, is a new metaphor for the Internet—an interface to the world which allows us to talk not only to the machine, but through it to all other parties on the line. Stephen Marcus, a writer and educator, clarifies these ideas when he attempts to broaden our notion of what's going on by thinking a little more about the medium. He suggests we not think in terms of the technology or method, but in terms of destination. "Telecommunications is not simply a conduit for getting information from one place to another. Instead, it is itself a place to go."

Thus, the Internet is a place to disseminate information, seek information, and communicate, teach and learn. The promise of the Internet and the tools that allow us to access and navigate need to be understood and learned. I hope this Internet article and the ones that follow give you a glimpse of the promise of tools to communicate with others in your profession and the potential for your students.

Aloha,

Paola Williams. *Punahou School, Honolulu, Hawaii, 96825; e-mail: pwilliam@uhunix.uhcc.hawaii.edu.*

Hypermedia-Based Teacher Education

Trudy Abramson

Introduction

In the Spring 1994 issue of *HyperNexus* (Lamb, 1994), readers said that they are most interested in articles which feature practical classroom applications of hypermedia. In this issue, we will begin a series of articles that respond to those requests.

This short paper provides background for the hypermedia collaborative learning processes developed over four years with small groups of dedicated and hard-working graduate students/student teachers. We present our results so that others can replicate and build upon them.

The Learners and the Environment

Many of the articles that will appear in this series are midterm and final assignments prepared as a partial fulfillment for a grade in two hypermedia-based graduate teacher education courses offered from the fall of 1990 through the spring of 1994 at William Paterson College of New Jersey. Both the *HyperCard*-based Mac course, which was offered in the fall semester, and the *LinkWay*-based PC course, which was offered in the spring semester, were run through networked computer labs housed in the School of Science.

As a teacher educator, I could not have hoped for a better group of teachers with whom to work. I had decided to use these courses as experiments and models in collaborative, technology-based learning measured by authentic assessment. All the students were classroom teachers and most were homemakers; graduate education had to fit somewhere within their already-full agendas. Fortunately, the groups were small (<15) and the technology was plentiful. Unfortunately, the administrative support provided in 1990-1991 disappeared with the arrival of new administrators. No hardware or software needs were met after the first year.

The prerequisite introductory course presented teachers with PC and Mac literacy skills using integrated software packages and content software. It also served as a self-selection process during which students determined if they were willing to invest the necessary time and effort. Many participants in the initial course maintained that they came to graduate school as students to be filled with knowledge, and that my courses unfairly demanded constant active learning on their parts. (They were not going to pay for courses and work at them at the same time.) Still others were averse to having all their developmental efforts on constant display to their peers, and they disliked the group effort requirements. Those with greater courage and curiosity remained with the program, and experienced enormous professional growth and competence in an active, participatory peer environment.

Both hypermedia courses followed a common sequence: (1) skill mastery in the use of a tool, (2) development of model, tool-based learning experiences, and (3) micro-teaching of the resulting lessons/units within the peer group. The courses could be taken in any sequence. Typically, the teachers found the second environment mastered (whichever one that happened to be) easier than the first, although it was within the second course that hypermedia concepts became truly meaningful. Had it been possible, we would have switched to *HyperStudio* on the Mac because of its color and animation features.

The *HyperCard* Course

Fall semester of 1993 was the second time that I taught "*HyperCard* Theory and Applications," a course developed originally by a colleague from the Department of Mathematics who taught the course in the fall of 1990 and 1992. The applications developed by my first group were combined as a software program, "The Bill of Rights and Beyond...." This full-group production was described in another ISTE publication, *SIGTC Connections* (Abramson, 1992).

Last fall, the skills-acquisition text was Beekman (1992), and theory was provided with readings, many of which were from this journal. The fourteen teachers enrolled knew one another from other courses in the program; they readily formed workgroups of two and three.

Typically, sessions began with theory and discussion of readings from within the hypermedia literature. It was very important to me that the teachers developed concepts that could be transferred to other environments, as well as skills to be applied within limited domains. Following discussion, the hands-on assignment for the day was discussed and the workgroups began their tasks. Throughout the session, teachers visited other workgroups to compare and contrast, request help, and share insights. My job was to circulate, troubleshoot, and encourage. At the end of each session, we met as a full group to wrap up the experience.

A collaborative environment requires that, wherever feasible, students participate in all aspects of the learning experience. The mid-term assignment was to develop a *HyperCard* tutorial for a designated range of grades. The class determined that although *HyperCard* has five basic objects (stack, background, card, button, and field; Lamb, 1991), background was a confusing element and should not be part of a beginner's tutorial. The assignment, therefore, limited the skill elements to a single stack, fewer than ten cards, with meaningful buttons, words, and pictures. The objective of the tutorial was to develop a structure using easily-referenced content that could then be expanded for content-rich project development. Each workgroup developed its own tutorial, field tested at least two other tutorials, and revised its work based upon feedback from other user groups.

"*HyperCard*, A Tutorial," written by two exemplary teachers, Jan Borda and Saundra Josipowich, is intended for middle and junior high school teachers and their students. The development content is The Food Pyramid. Some of the graphics were drawn by the authors; others were clipped from the Educator Home Card. Their tutorial follows this paper.

In Conclusion

In issues to follow, learning experiences developed by other teachers will be presented. The criteria used for authentic assessment of hypermedia-based projects will be discussed. A good reason for sharing different executions of the same assignment is that it emphasizes different learning styles. Sometimes, one way of presenting information or skills just will not work with a given student or group of students. However, with a slightly different twist to the presentation manner, learning does occur. Read Jan and Saundra's tutorial in this issue, try it with your students, or use it to upgrade your own skills. Then provide *HyperNexus* with some feedback or, better yet, send us screen prints of the tutorial you and/or your students developed. A general rule to follow is that if you think something is interesting and useful, it probably is.

References

Abramson, G. (1992). Helping teachers create high-order, highly-motivating, hypermedia-based learning experiences. Part I: HyperCard. *SIGTC Connections 9*(1), 3-7.

Beekman, G. (1992). *HyperCard 2 in a Hurry*. CA: Wadsworth Publishing Company.

Lamb, A. (1994). Survey results. *HyperNexus 4*(2), 15-16.

Lamb, A. (1991). Teaching HyperCard background and card domains: Analogies and active participation. *HyperNexus 2*(1), 36-39.

***Dr. Trudy Abramson**, Nova Southeastern University, School of Computer and Information Sciences, 3100 SW 9th Avenue, Fort Lauderdale, FL 33315. e-mail: abramson@alpha.acast.nova.edu.*

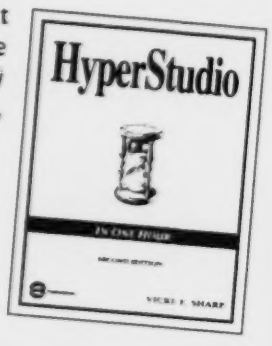
Lights! Camera! Action!

HyperStudio!

HyperStudio In One Hour puts you on the fast track to making it as a multimedia director in your classroom.

You and your students learn to create multidimensional reports, presentations, and portfolios. With numerous example screens and step-by-step instructions, author Vicki F. Sharp takes you through the development of your first *HyperStudio* stack.

Each *HyperStudio* card you create builds on the skills you have learned. Combine text and graphics, link cards, add and control audio, and run QuickTime movies. By the time you wrap up your first production, you and your students will have a new collection of tools for collecting and comparing information, presenting discoveries, recording progress, and expressing your creativity.



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HyperCard: A Tutorial

Jan Borda and Saundra Josipowich

Introduction

Welcome to the versatile world of *HyperCard*. We assume that you have some basic Macintosh experience, if only with content software, and that you are familiar with terms such as click, double-click, drag, and pull-down menu. Beyond that, this tutorial will provide the fundamentals of the program, *HyperCard*. We have chosen The Food Pyramid as the content for developing our model; consider following our model first and then reinforcing what you have learned using content of your choosing.

The stack we will develop together serves two purposes. It provides a tutorial for getting started in *HyperCard*. It also creates a motivating learning environment popularly referred to as interactive software.

Get Started

Begin by opening the program *HyperCard*, as you would any program. Go to the File Menu. Click on New Stack. A stack is a *HyperCard* file. A single screen in a stack is called a card. Type a name for your stack that is meaningful to its contents; ours is FoodPyramid. This naming convention will enable you to identify stacks without having to open and inspect them.

Next, pull down the Tools Menu and click and drag it to the top right corner of the screen. You will see a variety of tools for stack development. Double-click on the square that looks like a Paint Brush and drag the Pattern Palette menu that appears to the top left corner of the screen. Most of our *HyperCard* stack will be created with these two menus.

Before continuing, we need to understand the first three pictures at the top of the Tool Palette. The first square contains a hand. This is the Browsing Tool. It allows you to see if your buttons work properly (more on buttons to follow). The middle square has a shaded oval and is the Button Tool. We will use this tool to make buttons for navigating around the stack. The right square containing a rectangle with dots is the Field Tool. It enables you to put information on a card. All the remaining tools are paint tools, specifically designed for painting.

Create A Label or Heading

Click on the square with the capital A—the Text Tool. We recommend that this tool be used only for labeling, for writing small amounts of text. (Extensive writing should be done with the Field Tool, mentioned above.) Double click on the A, choose a font (a typeface), a size, and a style. You can preview your choices in the window on the bottom. When you are pleased with your selections, click OK. Place your I-beam at the top of the screen and type the label, as we typed "The Food Pyramid" on Sample Card A (Figure 1).

To center the heading, click on the bottom rectangle on the Tools Palette. This is the Selection Tool. Drag the cross-hair diagonally on the label to surround it and click once. The box should now be blinking. Put the cursor arrow inside the box, click and drag it to the desired position on the screen.

To change the position, hold the apple button (the command key) and Z at the same time and this will undo the last thing you did. To get rid of everything you have drawn, double click on the Eraser Tool (second row, middle).

Draw the Food Pyramid (triangle)

Click on the Polygon (bottom row, right). Put the cross-hair at the top of the page near the center of the title. Click and stretch the line diagonally until you get the length desired. Release the mouse button and drag the line across to what will be the other angle in the triangle and click to mark the position. Drag the line a third time to meet the point at the top. Click once again to complete your triangle. If you do not like the way it came out, erase it. Warning: If you double-click the eraser, you will lose everything including the heading.

Try this: Using the Polygon Tool, hold the shift key down as you make the line. This will "constrain" your lines and help you to make a perfect triangle. When the triangle meets with your approval, separate the triangle into three sections using the Line Tool. Use the shift key to draw straight lines.

Now we will color the sections. Click on a color on the Pattern Palette and choose white. Click on the Paint Bucket and carefully place the can inside the top section and click. You will not see anything happening because the area was white to begin with. Select Darken from the Paint Menu to give your top

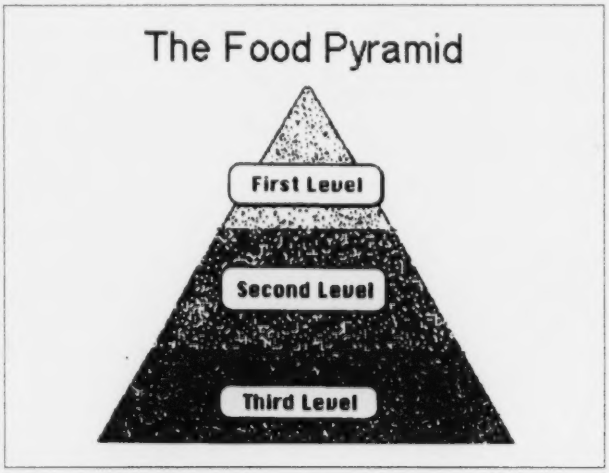

Figure 1. Sample Card A.

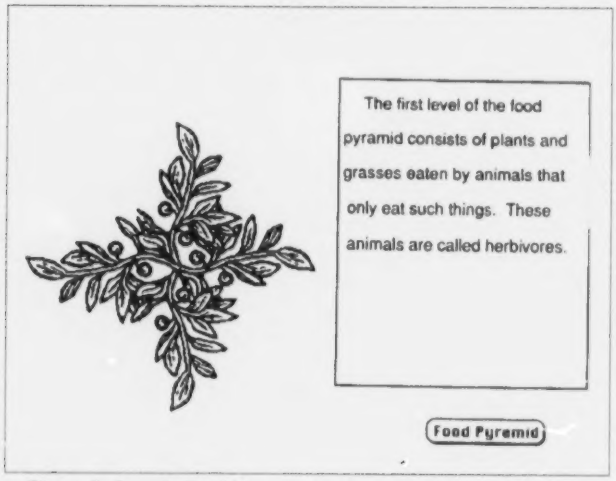
The first level of the food pyramid consists of plants and grasses eaten by animals that only eat such things. These animals are called herbivores.
Food Pyramid

Figure 2. Sample Card B.

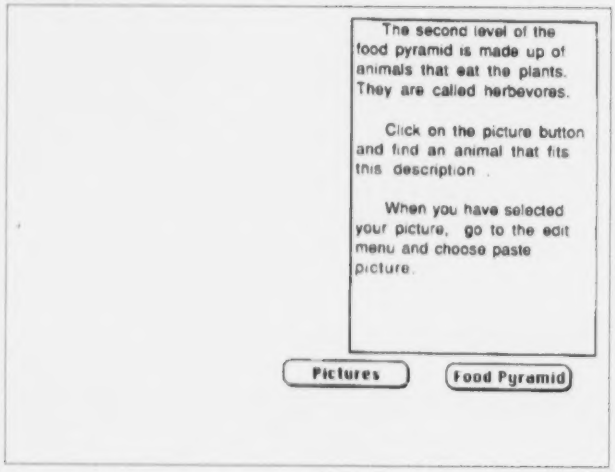
The second level of the food pyramid is made up of animals that eat the plants. They are called herbevores.
Click on the picture button and find an animal that fits this description .
When you have selected your picture, go to the edit menu and choose paste picture.
Pictures
Food Pyramid

Figure 3. Sample card C.

layer a speckled effect. Repeating the process will create more speckles. Now select the color grey from the Pattern Palette and repeat the process. This time, however, choose Lighten from the Paint Menu. For the third layer, use Black. An alternate procedure would be to choose patterns instead of colors. To do so, select the pattern, select the Paint Bucket and "fill" the designated area with the pattern.

Create A Button

Select the Button Tool (top row, middle). Go to the Object menu and select New Button. A new button will appear. Double-click it. Using Sample Card A as model, type First Level, selected Rounded Rec(tangle), click on Link To. From the Edit menu, select New Card and click on This Card. Double-click on the First Level button and pick Effect. You will see a list of visual effect; choose any one and click OK. Click on the First Level button, place the arrow on it, click and drag into position as per the Figure.

Select the Browsing tool, the hand, click the button to test it. Experiment with the effects. To return to the first card of the stack, go to the Go Menu and select First. Create two more buttons, Second Level and Third Level. Remember, we are working on the first card in the stack and to get back to it you must use the Go Menu.

Copy and Paste A Picture

Using the Browsing Tool, click on the First Level button. There will be a blank card facing you. Go to the File Menu and Open Stack. From the menu, go to Art Bits. Select Nature and Science, browse through the pictures until you find leaves or plants. Get the Lasso Tool and draw around the picture you want. It will blink. Next, go to the Edit Menu and select Copy. The picture will be copied to the clipboard in order to be available to you when you work in your stack.

Go to the File Menu, select Open Stack and retrieve your stack. Click on First Level to return to your blank card. From the Edit Menu, select Paste Picture. Put the cursor arrow on the picture and drag it into the place of your choice. You can paste as many copies as you like. To change the picture's layout, go to the Paint Menu and choose one of the options.

Write Text in A Field

Go to the Objects Menu and select New Field. Stretch and drag into position and shape. Select the Browsing Tool, position the I-beam in the box and click. Choose a font from the Font Menu and type the text as shown on Sample Card B (Figure 2).

At this point, we need to devise an easy way to get back to the first card in the stack. The solution is to create a Return Button. Make a button using the steps outlined above; call it Food Pyramid. From the Go Menu, click First and then This Card.

Work on the Second Level Card

This time, we will copy a button rather than create one from scratch. Go to the first card in the stack and the to the First Level card (the one with the plant). Make sure you are on the Button Tool. Click on the button to select it and go to the Edit Menu and Copy Button. Go to the Second Level card. Using the Edit Menu, select Paste Button, drag and position the button at the bottom of the screen.

Make a new text field as you did on the First Level Card and enter the information (see Figure 3). When that is done, we will create a button to take us to the picture screen. If you are not sure of what we did, refer back to Copy and Paste and Picture above.

Make a new button, call it Pictures, and link it to a new page. On the new page, make a text field and enter the information (see Figure 4). Make a new button; this time click Show Name and Transparent. Click on Icon, scroll through the selections and pick the one that looks like a return arrow. Double click the

button and select Link To. Use the Go Menu, pick Previous, and then click This Card.

Now we have to get the pictures. Go to the File Menu and Open Stack. Look for the stack called Classroom Clip Art (or equivalent) and find animals. Browse through the pictures until you find some farm animals. Using the Lasso Tool, draw around all the animals, go to the Edit Menu and Copy Picture.

Return to your stack using the File Menu and go to your sample card d. From the Edit Menu, Paste Picture. Return to your Second Level card, select the Food Pyramid button with the Button Tool and copy it to the clipboard. (We will paste it later.)

Work on the Third Level Card

This card reinforces work done previously. Click on the Third Level button on the first card. Paste the Food Pyramid button along the bottom of the screen. Make a text field and type the information as per Sample Card e. Make a blank text field so your students can write in it. to get the picture for this card, go to the File Menu and Open Stack. Find Classroom Clip Art and select Animals. Scroll through the pictures until you find the tiger. Copy the picture, return to your stack, paste and position the tiger on the card.

Wrapup

That is it! You have created a *HyperCard* stack. If you feel uncomfortable with certain tasks, redo the tutorial. Provide alternate content to keep your motivation level high. Practice. The more you work with *HyperCard*, the easier it becomes.

Jan Borda *and* ***Saundra Josipowich*** *are classroom teachers. They are candidates for the Master of Education degree, Concentration in Learning Technologies, at William Paterson College of New Jersey.*

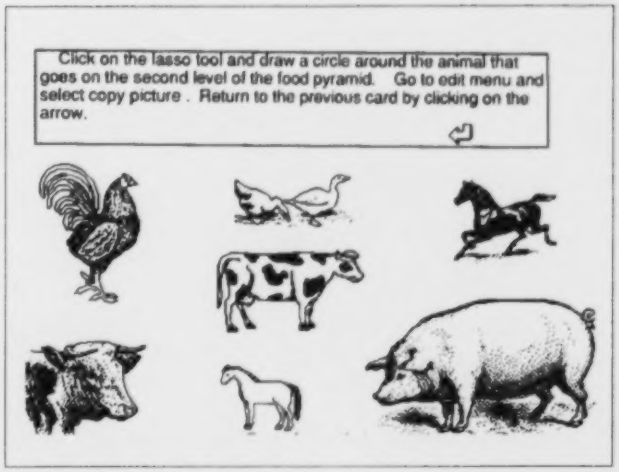
Click on the lasso tool and draw a circle around the animal that goes on the second level of the food pyramid. Go to edit menu and select copy picture . Return to the previous card by clicking on the arrow.

Figure 4. Sample card D.

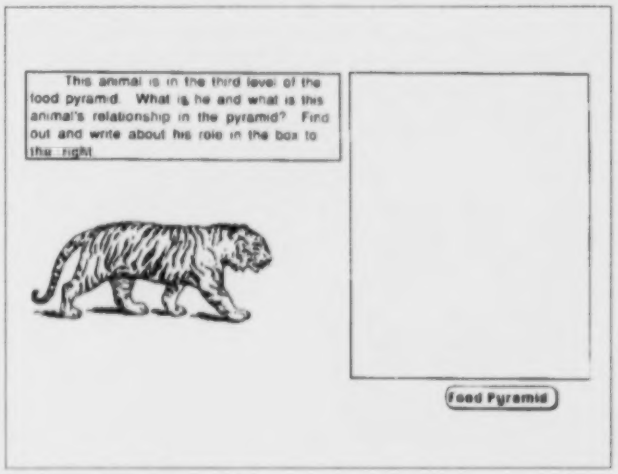
This animal is in the third level of the food pyramid. What is he and what is this animal's relationship in the pyramid? Find out and write about his role in the box to the right.
Food Pyramid

Figure 5. Sample card E.

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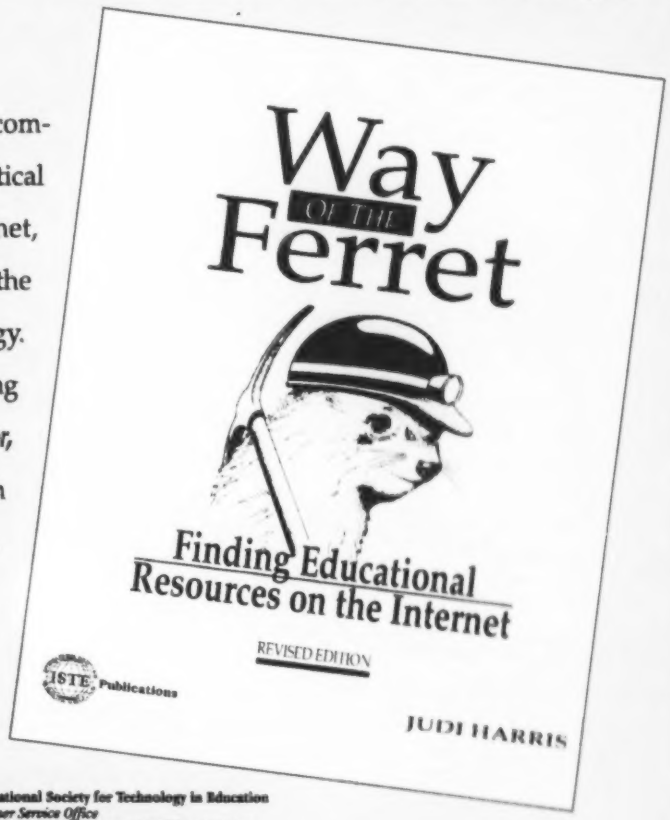

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Music: The Oldest Virtual Reality

James R. Tucker Jr.
and James J. McCluskey

Abstract
Most people only associate virtual reality with the mounted headgear and computer-generated images. This study will examine an expanded definition of virtual reality to include music, and offer support for the argument that it is the oldest form of virtual reality.

Virtual reality can be an altered perception. Something that feels real but isn't. Something that alters your perception of life as you think it exists. When most people think of virtual reality, they think of the headgear shown on many news programs. Those who know this technology have referred to Jaron Lanier as the "father of virtual reality." This is true, in part, because he invented the EyePhones and DataGloves most used in VR research (Rheingold, 1991).

But, if anything that alters your perception of reality is virtual reality, then there are many other things that could be considered to be VR as well. LSD would definitely be under the expanded list. Good movies and good books would likewise both enter the category. So would music.

It can be argued that music is the oldest existing type of virtual reality. Some researchers feel that music may be older than speech (Dallin, 1994) and it certainly predates written language.

Of the four basic concepts of virtual reality (Hayward, 1993), music only fits strongly under one of the categories. That of viewpoint, Everyone has a different life history. They have different tastes in music and they have different feelings. That is why one person can listen to a song and say, "That's incredible!" and another can listen to it and say "that sucked!"

There are differences tin the way music works as opposed to other forms of VR. The most common forms of virtual reality that most people of first are mainly visual. There is sound, but the main sense is sight. Music is almost exclusively aural: *almost* only because MTV is now a major source of music.

There are two parts to a song that affect a person in a manner to create virtual reality: the lyrics and the actual music. The lyrics are very important. To many they are the most important part of a song. The words should symbolize what the writer is feeling, much like poetry. After all, what is a song but a poem set to music, and what is a poem if it is meaningless? Unfortunately there are many performers singing songs that are meaningless and artless. The Celine Donnes and Michael Boltons unfortunately make up a vast majority of today's pop music.

Police guitarist Andy Summers summed up most of pop music in a recent interview (Garbarini) when he said "the problem with so much pop music is that it comes at you and tells you emotions you're supposed to be feeling, which I absolutely hate. The best stuff avoids that... because you can always find something new in it—new space to explore emotionally or musically."

Some modern-day musicians believe most of the artistic musicians are dead. Kurt Cobain, for instance, was found dead of a self-inflicted gunshot wound on April 8, 1994. He was called the spokesman for a generation. He was troubled. And, like many artists throughout time, he was brilliant. In the song "Lithium" from the album *Nevermind* he wrote:

I'm so happy, 'cause today I've found my friends, Here in my head
I'm so ugly, that's okay 'cause so are you.
We broke our mirrors.
Sunday morning is every day for all I care
And I'm not scared.
Light my candles in a daze 'cause I found God.

He was obviously writing from the heart. He felt alienated. He was scared about fame, as well, and the song "Dumb" from *In Utero* shows this:

I'm not like them,
But I can pretend

And in the song "Serve the Servants" also from *In Utero*, it begins with the words:

Teenage angst has paid off well
Now I'm bored and old

These lyrics tell us about him. Listen to the songs and you might find yourself surprised he didn't kill himself earlier. But in all these songs, he seems to be accepting himself as a rock star and a person. They seem to be songs of alienation with self-realization as a goal.

Jim Morrison is another great dead lyricist. His personal demons and drug abuse led him to write some of the most beautiful and haunting lyrics ever (Paul, 1994).

The last verse of "The End," from the Doors' first album, may be some of the most beautiful words ever heard.

This is the end, hinted the friends, the end.
This is the end, my only friend, the end.
It hurts to set you free, that you'll never follow me.
The end of laughter and soft light.
The end of all who tried to die.
This is the end.

When you listen to that song you may feel a sense of loss. Some people feel like their best friend is leaving and they may

never get to see them again. The song has personal meanings for some people that others might not understand.

"People are Strange" from *Strange Days* was written when Morrison was in a suicidal mood (Paul, 1994). He and two members of the band went up a hill to watch the sunset and had a mood shift. His realizations on humans are in the song which he wrote on that hill:

People are strange when you're a stranger,
Faces look ugly when you're alone.
Women seem wicked when you're unwanted,
Streets are uneven when you're down.

This song can make us feel good. It helps us remember that we are not the only ones who get depressed.

But not all good songwriters are dead. With The Police, Sting wrote some of the best songs of the late 70s and early 80s. "Every Breath You Take" is a song of a man and his descent into insanity after a breakup with a woman. At least that's how some people understand it. Sting's lyrics capture his emotions:

Every breath you take,
Every move you make,
Every bond you break,
Every step you take,
I'll be watching you.

And later in the song, he writes

Since you've gone I been long without a trace,
I dream at night I can only see your face,
I look around but it's you I can't replace,
I feel so cold and I long for your embrace.
I keep crying baby, baby, please

Roger Waters, formerly of Pink Floyd, is another great living lyricist. "Time," from the landmark album, *The Dark Side of the Moon,* tells us that today may be the last day we're alive. To do things now. To not waste time. The lyrics follow:

Ticking away the moments that make up a dull day,
You fritter and waste the hours in an offhand way.
Kicking around on a piece of ground in your home town,
Waiting for someone or something to show you the way.

Led Zeppelin was one of the greatest bands of all time. Nearly all of the songs were written by more than one member of the group. A notable exception to this was their first big radio hit, "Dazed and Confused." The song was written by Jimmy Page when The Yardbirds were still together and he brought it with him to the new band. The song can make you feel like you've just ended a relationship with someone in a rather bad way. The song was written from the view of a misogynist. The opening lyrics should explain:

Been dazed and confused for long it's not true,
Wanted a woman never bargained for you.
Lot of people talking, few of them know,
Soul of a woman was created below.

And there are the great songwriting teams. John Lennon and Paul McCartney changed rock and roll from teen-age music to an art form.

The song "In My Life" is a prime example of this:

There are places I remember, all my life,
Though some have changed,
Some forever, not for better,
Some have gone and some remain.

Then, later in the song, they continue:

But of all these friends and lovers,
there is no one compares with you,
and these memories lose their meaning,
When I think of love as something new.

This is another song that can make us feel good when we're depressed. It assures us that everything *will* get better. Eventually, love finds everyone again.

The other facet of a song is the music. Because the words handle the direct message, the music must complement the lyrics. Let us again reflect upon The Police and their song "Every Breath You Take." Andy Summers, the guitarist for The Police, once said it had the kind of chord progression that you could hear coming a mile away (Garbarini, 1994). That's usually bad for a song. But it helped to capture the emotional downward-spiral the song represented.

Robbie Krieger of The Doors also contributed to the bands' great songs. Besides writing several of their songs, including "Light My Fire" and "Love Me Two Times," his musical background helped flesh out their sound. On "The End" Robbie tuned his guitar down so that it sounded like a sitar. It gave the song an Eastern—almost mystical—sound and texture (Wyatt, 1994). It plays off the words well, creating a haunting effect that one should get when dealings with a song like "The End."

The Beatles were not virtuosos; even they admitted it (Buk, 1994). But the use of layering guitars enabled their songs to have the right feel. The song "In My Life" is prime example of this. You can barely hear anything but the drums and voices while the singing is going on. But the music has a kind of sad feel to it. It fits, because it's a song some listen to a lot when they're feeling sad.

Jimmy Page of Led Zeppelin was a virtuoso guitarist. The song "Dazed and Confused" would often take up to 45 minutes to play live. Many of the riffs he improvised in the live show were turned into songs on the second album (Crowe, 1990). Among them these was "Whole Lotta Love." It was as Wolf Marshall put it, "Heavy metal's first anthem." Built on a simple pattern with no chord changes it is incredibly simple. But unforgettable.

Music is what motivates the world. The musicians of the sixties were not idiots when thought music could change the world. The were wrong in how it happened, though. Jaron Lanier, father of virtual reality, first became attracted to computers as a way to make music (Rheingold, 1991). But his goal was to make perfect music. Without mistakes. That would have taken away the virtual reality from music. Because without a soul and without feeling, the music is just random pitches that happen to go in a mathematical order that goes well together. Jimmy Page would take three or four takes of a guitar solo and use the best (Palmer, 1990). It wasn't always the technically perfect take, but the one with the most feeling. The one that helped the overall song rather than just a reason to solo. And a computer can't do that. But a song can engage our senses and draw us into a dream-like world just as effectively as the most technological advanced VR system available today... if we open our minds to the vibrations and the spirit of the truly great performers of our musical age.

James R. Tucker, Jr.. and James J. McCluskey, Ph.D., *University of Oklahoma, Norman, Oklahoma.*

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Product Review of SimCity 2000

Michael J. Williams

Title: *SimCity 2000*
Year: 1993
Publisher: Maxis, 2 Theatre Square, Orinda, CA 94563-3346; ph. 510/254-9700.
Designed by: Fred Haslam and Will Wright
Price: $39.95 (purchased at Media Play in Daytona Beach, FL)
Platform: Macintosh and IBM
Media: Two 3.5" High-Density floppy disks.
Hardware Requirements: (For Macintosh and Power Macintosh): 2.5Mb free RAM, hard disk with 3Mb free, mouse, 8-bit (256-color) graphics, and System 7.0 or higher. Also available for IBM and compatibles (DOS and *Windows*).
Classification: SimCity 2000 is a simulation.
Domain: For entertainment mostly, but the popular moniker "Edutainment" can also be used.
Subject Area: It can be loosely tied to the study of "civics" (social studies). The packaging uses the category "Sim-Business." The user becomes the planner and mayor of a city.
Other Titles in SimCity: *SimCity Classic, SimAnt, SimLife, SimEarth, Series:SimFarm, Sim Health, SimTower,* and *SimTown.*
Age Range of Users: While the box or accompanying literature did not specify an age range, a review in MacUser (12/94) stated "10 years to adult." I would say that a child as young as 7 or 8 would find it entertaining (with some adult assistance), but to get full value, perhaps "12 and up" would be more accurate.
Minimum Reading Level of Users: With words like "default" and "infrastructure," 8th grade seems to be the most appropriate reading level with regards to the manual. As for onscreen reading requirements, 6th grade should be sufficient.

Program Description

The primary purpose of *SimCity 2000* is entertainment. The fact that lessons in money management, planning and crisis management might be learned is purely serendipitous. The game appears to be "alive" at times, as the city's inhabitants (Sims) multiply, move about, and, if mistakes are made, leave.

A game begins with a window containing a three-dimensional map that is devoid of all "man-made" objects. Topography includes 32 levels of altitude, lakes, valleys, mountains, streams, rivers, waterfalls, an ocean shoreline, and forests. The land used for a particular city can either be randomly generated by the computer, or a "city editor" can be used to select the placement and amount of the various geography. Land on the map is divided into segments called "tiles." Each tile is scaled to approximately one acre in area. Some larger buildings may take up several tiles. The total amount of land available for play is a scale five miles by five miles. Allowing the computer to generate terrain will result in standard percentages of hills (25%), water (10%), and trees (31%). These percentages are based on the total number of tiles with a certain terrain feature.

Once the "lay of the land" has been set, several conditions must be met before Sims will inhabit the city. First, areas must be designated (zoned) for industrial, commercial and residential use by "clicking" on a button and highlighting desired areas. Next, a powerplant must be constructed. Depending on the year (the game starts in January, 1900), different technologies are selected (initially, only coal, gas, and hydroelectric power are available, and ultimately nuclear, solar, microwave, and fusion). Each technology of power has different electrical outputs, effects on the environment, and costs. The last essential factor for attracting Sims is to provide the basic infrastructure such as roads, power lines, and water service. After these three requirements are in place, Sims will begin building houses, factories, and stores. They will also fly airplanes, drive trains and boats, and congest the roads and highways.

To control the city, there is an array of buttons that control all functions of building and viewing. How rapid time passes is determined by a pull-down window with four different speeds including pause. As the years progress, a variety of technologies become available that include airplanes, bridge construction, superhighways, and huge single building cities called arcologies. There are also plenty of surprises including; rewards for certain milestones (such as a mayoral mansion and a statue), and different disasters (hurricanes, earthquakes, plane crashes, alien monsters, etc.). *SimCity 2000* is more interactive than its predecessors, with features that include the ability to name virtually everything (like parts of the city, certain buildings, schools, etc.) and to connect with other "neighboring" cities.

The metaphor of *SimCity 2000* is a simulated city within a "Sim Nation" that includes four neighboring cities. By interacting with the other cities, economic and population factors are affected. Population figures for the neighboring cities, the user's city, and Sim Nation are accessible by clicking on a button.

Documentation And Technical Information

In addition to easy-to-understand buttons and pull-down menus, there is a built-in help feature which is activated by clicking the right mouse button or holding down the shift key while selecting a feature. The 140-page User's Manual included with the package is adequate for initial play. For those wishing to become experts, two commercial guides are available: *SimCity 2000, Power Politics and Planning* for $19.95; and *The Official SimCity 2000 Planning Commission Handbook*, also $19.95. These may be ordered using an order form that comes with the game. If all else fails, Maxis provides a toll-free technical support line and a BBS that can be reached by modem.

As previously mentioned, *SimCity 2000* was designed primarily as entertainment; however, there are a number of ways it

can be utilized in a learning environment. An example would be the practice of critical-thinking skills. Basic money management (allocating funds as needed), planning (establishing the various construction zones), and an appreciation for the environment (problems include pollution, deforestation, and overpopulation), can all be addressed. If used in an instructional mode, city templates can be created so all students can have the same starting point.

Management Factors

Progress can be tracked a numbers of ways: population, financial prosperity, and a series of graphs which display unemployment, GNP, and even a "Fed Rate" percentage as determined by the SimNation's Federal Reserve Board. Cities can be SAVED at any stage of development or growth.

No typographical or grammatical errors were detected in either the software or the User's Manual. The economical value of *SimCity 2000* is very good when factoring in the complexity, technical support, and hours of enjoyment.

While the program is relatively simple to learn and use, the User's Manual is essential to the first-time player. For a first-time user without any previous Sim-Product experience, an hour or so should be sufficient to attain favorable results.

Instructional Characteristics

Since the target audience appears to be fairly generic, it is hard to critique its appropriateness. However, as an entertainment simulation, the appeal to arcade or "action" users may be somewhat limited. Graphics, color, and sound are all state-of-the-art and very well done. The learning curve is relatively short, but mastery of the game may take some time. While *SimCity 2000* is linear, based upon the passage of "time," there are infinite city configurations and philosophies that can be applied.

One of the few pitfalls I have noticed while using the program involves building up funds for continued growth. While "taxes" are collected every year, many years can pass (in some cases over a hundred years) before enough money will be available to build expensive items such as airports, seaports, fusion powerplants, and arcologies. Hours may be necessary to build up adequate cash reserves. Another "problem" concerns the complexity of more advanced cities. It is very easy, when most of the available land is inhabited, to miss smaller problems (such as small fires, traffic jams, and roads requiring

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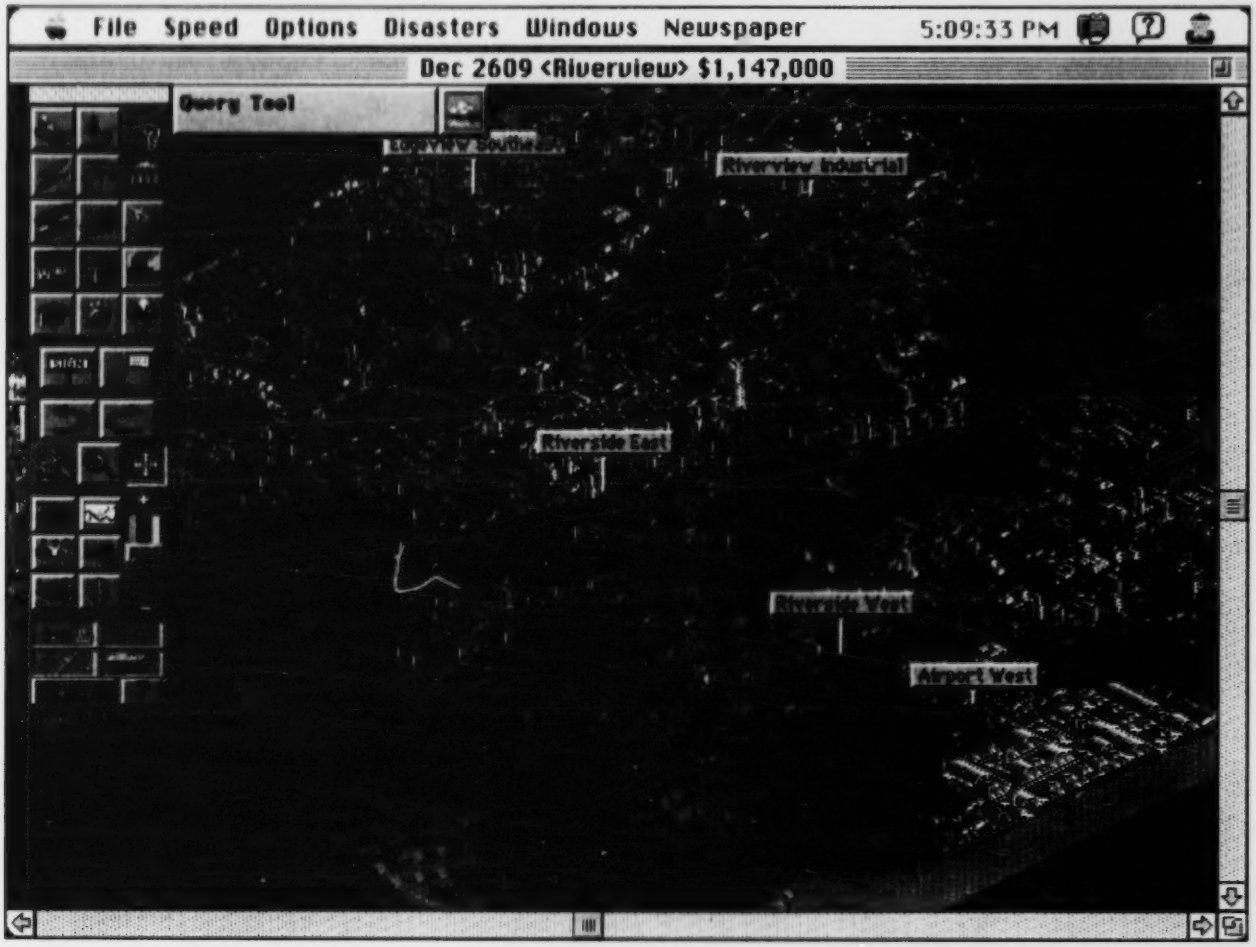

repair) that occur, resulting in the formation of slums, high crime rates, etc., which in turn reduce property values and the amount of taxes collected.

Included in the package are a number of scenarios depicting different situations. Each scenario has a predefined "win" condition (unlike the normal mode where the user determines success). Upon winning a scenario, a "key to the city" is awarded which permits continued play. Scenarios include; the 1991 Oakland Fire, Hurricane Hugo striking Charleston, and unemployment in Flint, Michigan.

Further Study

As a result of the suggestion made from the on-line feedback, several younger users were used to gain additional insight into the educational ability of *SimCity 2000*. My daughter and two of her friends were invited to play with the game during a recent slumber party. It was interesting to hear their comments and reactions to certain parts of the game. All three girls were in the 13- to 14-year-old age bracket and fairly computer literate. Only my daughter had used the software before and I asked her to provide as little guidance as possible. Play started around 9 pm and was continuing when I went to bed at 12:30 am. With a only a few interruptions for snacks and makeup, they were constantly at it. We have two computers that can play the game (a Macintosh Quadra 660AV and a Macintosh LC) and they shared very well. One of the important points was that the girls were able to "compete" against one another and compare progress. They learned early to let the game run on its own (hence the interruptions) so cash could be earned to continue progress.

All were successful in that each city was growing and "earning" money when they finally collapsed from exhaustion. The majority of comments were directed at how "cool" the game was and there was a certain fascination at watching the cities grow. They also expressed a little shock when a disaster wrecked a part of their city—to include destroying Sims. Overall I appreciated the comments and feedback provided as it served to reinforce the positive feelings I have for the package.

Michael J. Williams, *Associate Professor, Embry-Riddle Aeronautical University; ph. 904/226-6777; e-mail: williams@db.erau.edu.*

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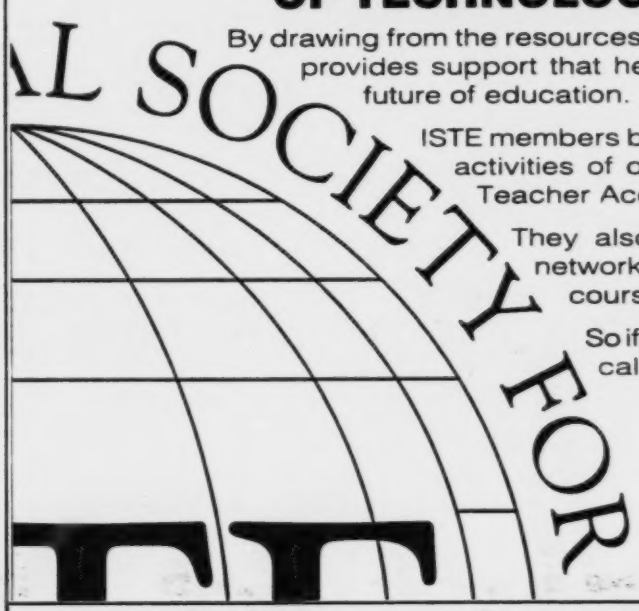

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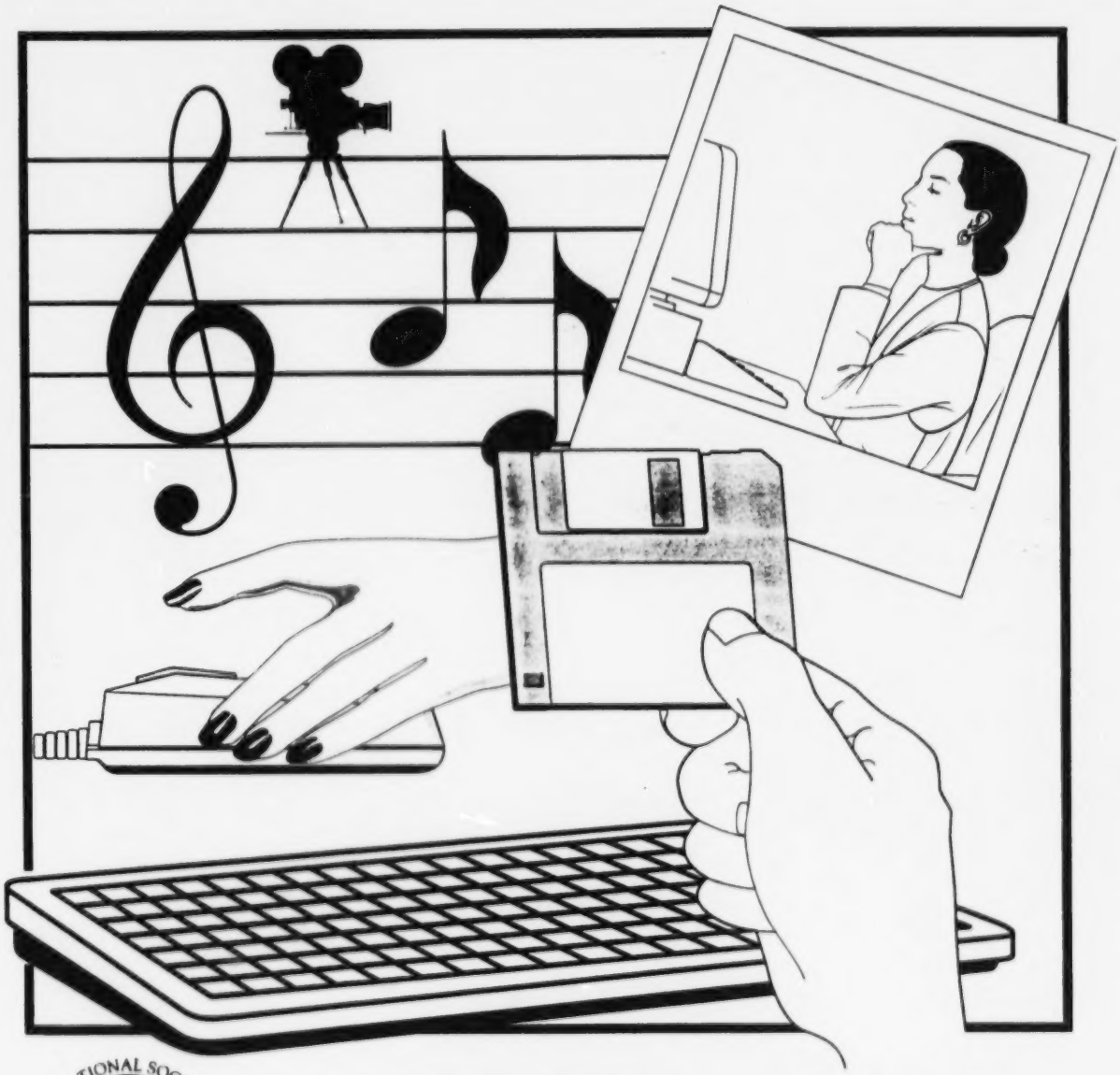

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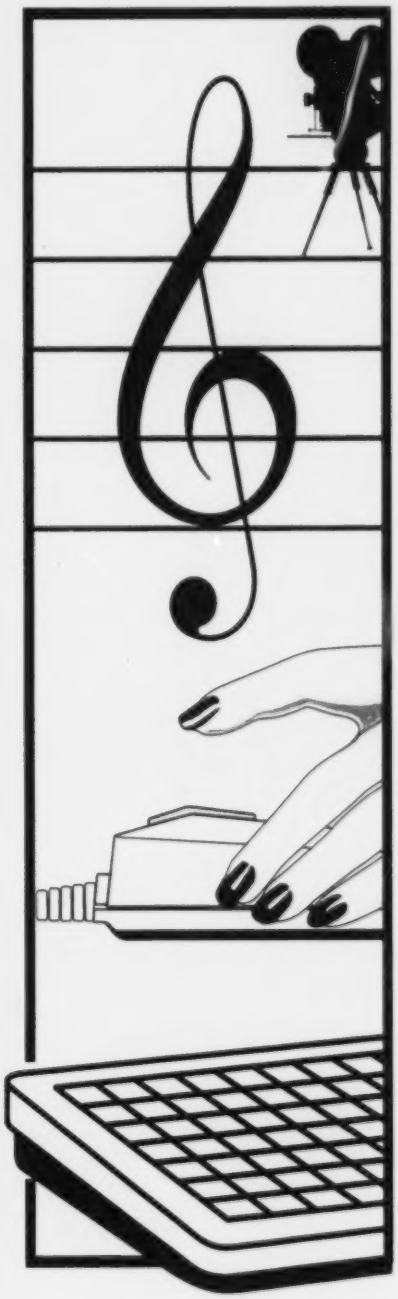

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In This Issue

Trudy Abramson

Although hypermedia/multimedia authoring systems such as *Ten Core* and *Quest* have been around for quite some time, systems for schools—namely *HyperCard* on the Mac and *LinkWay* on the PC—are much newer technologies. This decade has witnessed a proliferation of authoring tools and, hopefully, their applications in many educational settings. This issue features a variety of tools and applications.

James W. Beal, a junior high school computer education and social studies teacher, teaches in rural, north-central Illinois. His article focuses upon a *LinkWay*-based (DOS) class project on the American Civil War. He observes that the amount of time the students spent looking through books as they constructed their electronic projects far exceeded any class's prior research attempts. This is very significant in support of the position that the use of computer-based learning tools improves the subject content learning.

Paul Giguere is an educational computer specialist in Newton, Massachusetts. An advocate of constructivist learning, he describes a new multimedia development tool that provides a front end interface for *HyperCard*. This Mac tool, written for student use, is called *HyperGASP*. His article describes how the tool is used. Readers, if you are using *HyperGASP* with your students, please send some samples of their work.

Trudy Abramson, *HyperNexus* incoming editor, continues the series of elementary tutorials. She has written a short, thought-provoking article on Authoring Systems and Constructivist Learning, a subject that unifies the work presented in this issue.

Carol Caffery, a school librarian and Kim Lui, a mathematic teacher, both in northern New Jersey, contribute an easy-to-emulate tutorial on getting started with *HyperCard* (Mac). The article assumes that discussion of the environment has preceded hands-on use and jumps right into stack development. This is a fun piece that can be taught to elementary school students who could then create courseware for early childhood classes.

Bernard Paul Sypniewski, describes an application called *ARIST* that he developed with a DOS-based hypertext system called *HyperTIES* when he was teaching at a community college in southern New Jersey. This article is an example of work that uses hypermedia as a tool for classroom instruction and, alternately, provides a means for students to construct their own textbooks. The author provides useful guidance in setting up a meaningful navigator using a logical linking system.

The last two articles should be read as a continuation of the controversy posed by Trudy Abramson when she discusses the issue of combining or separating mastery of authoring tools from the process of courseware development.

Gary Ferrington, who teaches at the University of Oregon, presents an aspect of multimedia design that is platform independent. He advocates the use of short motion picture sequences in multimedia productions. He describes the technology and discusses its benefits to the teaching and learning processes.

Don Hall, a technology consultant with the state department of education in Kentucky, describes human-computer interaction and its impact on multimedia design. He discusses control, feedback, and a host of potential problems that the designer must take into account in the development process.

Because of the problems encountered in the publication of volume 5 and the desire to get *HyperNexus* back on track, there are no case study product reviews or virtual reality articles in this issue, nor is there a message from the SIG President. All these features, and new ones, will appear in Volume 6. Enthusiastic reader participation is anticipated.

The Civil War: An Example of Integrating LinkWay Into the Social Studies Curriculum

James W. Beal

LinkWay is a dynamic hypermedia tool that can be incorporated across the curriculum. Many social studies teachers may have found it difficult to incorporate computer technology into their curriculum. In fact, some of these same teachers may be asking why they should try. The traditional forms of reading, lecture, discussion and writing have served us well for years, so why do we need to change? The answer, of course, is that not all students respond well to the traditional pedagogy. *LinkWay* provides one of many alternatives to conventional techniques.

The introduction of hypermedia authoring tools into a social studies curriculum provides motivation and interest beyond what can be provided with other conventional curriculum materials. Certainly, some of this motivation comes from the technology itself and may eventually wane. However, over the last several years that I have taught with *LinkWay*, I have not noticed any decline in enthusiasm by students.

Microcomputer enthusiasm is not the only, or even significant, reason for using *LinkWay* in the classroom. It provides a "hands on" alternative to teaching social studies in which students are not bound to a written assignment as a cumulative project. They have a wider range of choices in which they can become more creative and produce a product that they, and others in the class, can enjoy together.

Aside from the motivational and "hands on" aspects of hypermedia, the process of developing an application leads students through many of the cognitive skills they need to develop. When students take a vast array of information (pictures, text, sound, etc.) and incorporate it into an application program, they are developing their organizational and problem-solving skills. The collection, adaptation, and utilization of these materials in a hypermedia application promotes higher level cognitive skills such as evaluation, analysis and, ultimately, synthesis. Creativity is further enhanced if the assignment's structure is loose enough to allow the students to create diverse solutions to the problems presented to them.

Hypermedia structures provide for the creation of applications that are reflective of the divergent thought processes we wish to encourage and develop in our students. By developing a *LinkWay* application, the learner is turned from a passive receptor of knowledge to an active participant in accessing, using, and developing sources of knowledge. Students learn that the hypermedia tool allows them to share their knowledge base with their peers.

Computer science teachers are interested in projects such as these because, as with all cross-curricular/interdisciplinary activities, the use of computer technology outside of the "computer class" demonstrates the usefulness and importance of this technology in all areas of our society. It promotes motivation in the computer science class by providing a meaningful project to work on. It also provides an opportunity for the school to acquire additional instructional programs by utilizing the students' finished product.

The Project

I picked the American Civil War as the topic of the project for two reasons. First, it is the first war to be documented in photographs which could be easily digitized and used in *LinkWay*. Secondly, it fell about mid-year in our curriculum. This is the time of year between Christmas and spring break that seems to drag by for many students (and some teachers). It also is early enough to allow plenty of time to get the projects finished.

Our school's computer lab, though not extensive, does have some hypermedia technology available. The lab environment used for this project consisted of seven 386 and 486 computers, two video capture boards (one is sufficient), two IBM speech adapters, a Digispeech adapter and a hand-held scanner. We used a Cannon Zapshot camera, a video camera, and a videotape player in conjunction with the video boards. The most effective tool for digitizing pictures was the hand-held scanner.

I began this project by breaking the class up into seven groups of two to three students. I assigned each group one particular historical aspect or topic of the period. These topics included:

1. Antebellum period.
2. Eastern campaigns (prior to March, 1864).
3. Western campaigns (prior to March, 1864).
4. Final campaigns (after March, 1864).
5. New weapons and inventions.
6. Important people (civilian and military).
7. Reconstruction.

These topics are of varying difficulty. For example, the New Weapons and Inventions topic can be approached by students that deal more effectively with concrete rather than abstract ideas. The Reconstruction period deals more with abstract ideas such as rights, laws, and state constitutions and would be more appropriate for students that excel in conceptual thought processing.

Each group was assigned to create a *LinkWay* application program that would effectively convey the information on each of these topics. This group of seventh graders had already been familiarized with *LinkWay* during sixth grade, and had basic

knowledge on how to create pages, folders, and a few types of buttons. During this project they learned how to digitize sound and pictures, script buttons, and animate.

As a first step, students were given an overview of some basic program design features, such as the use of an hierarchical menu structure, menu (button) bars, consistency in placement and naming of buttons, navigation buttons, menu buttons and exit buttons. The importance of using menus and allowing the user to back out and navigate their way through the program was stressed. I drew on several examples of programs that students were familiar with at school and game programs they played at home.

The second step was to have every group produce a series of storyboards that depicted what they wish to accomplish in their program. Each group was provided with a photocopied set of storyboard forms. A form consisted of a large rectangle in which to sketch the proposed screen with blanks that indicated which page(s) it had been linked to and from. This complete set of storyboards had to be turned in and approved before the students were allowed to touch a computer. Storyboarding is absolutely crucial in these types of projects. It provides organization of ideas and prompts the students to do the historical research and search for resources (pictures, sound, music, etc.) necessary for its success. Not allowing the students access to the computers until the planning is done results in more efficient use of the computer lab time.

Once the storyboards had been completed, I sat down with each group in order to clarify and discuss their plan. When this was accomplished, they were turned loose to work on their project. From this point on my role became that of a facilitator. As a facilitator, I helped each group solve problems they could not solve themselves. I helped them with the digitizing software, with scripting, and by reviewing their progress. I also redirected those few students who were off task and helped groups that had difficulty dividing up the workload.

At the conclusion of this project, all of the students' folders were combined into one large program on the Civil War. As the programs were being finished, I had a few of the early finishers begin work on a master program that would allow access to each group's program. To do this we had to put the master program into one subdirectory with each group's program in a subdirectory below it. By using the DOS access feature of *LinkWay*, the master program could shift directories and then link to the appropriate group program.

Overall, the project was a success. For many students, the American Civil War is not the highlight of their junior high experience. However, many students were captivated by *LinkWay*. Most students found the most interesting parts of *LinkWay* authoring to be the manipulation of pictures and sound. Students were fascinated by the LWPAINT program and being able to introduce scanned pictures directly into their application program. Other students were equally fascinated with animation and speech digitization.

I have never seen students going through so many history books in search of Civil War data. The fact that it was the first war to be so well documented in photographs, as previously mentioned, was one reason I had picked this topic for the project. As usual, I brought in extra books on the Civil War to supplement the text. This time many of the students also brought in books. Instead of the books being passed around in class or grudgingly used to write a report, they were now in great demand as resources for their projects! Since this project was used as a supplement to our regular Civil War curriculum, I found that students did better on the tests I use for assessment on this unit.

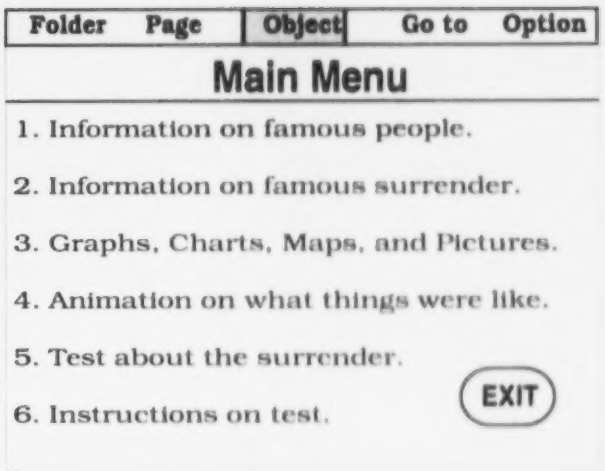
In the spring I was asked to select two students to represent the school at the "Tech 2000" exposition in Springfield, Illinois. The focus of this exposition was to generate legislative interest in supporting computer technology in Illinois schools. These students demonstrated the class project to state legislators and officials in the capitol building. Now my students had not only learned about the Civil War, but had become political activists for educational improvement in Illinois as well!

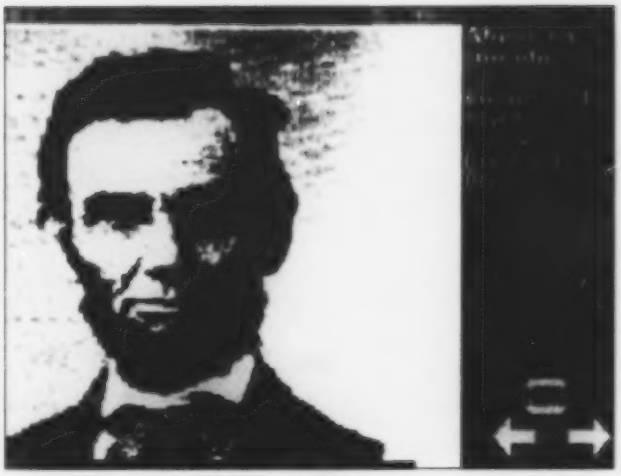
Here are a few helpful hints that may help you get over some of the snags that can occur. First, you must realize that the process of digitizing pictures and sound can result in two big bottlenecks in the development process depending upon the number of sound and video capture cards you have. This will require students to share these resources. After the storyboarding process is complete, I believe that it is important to have students develop the structure of their program before they become too involved in the digitizing of pictures and sound. I have them create all the folders and pages that their storyboard plan requires. Initially all of these pages are blank, however they can begin to construct their logical links (buttons, menus, etc.) and continue their research while they are waiting for their turn to digitize information.

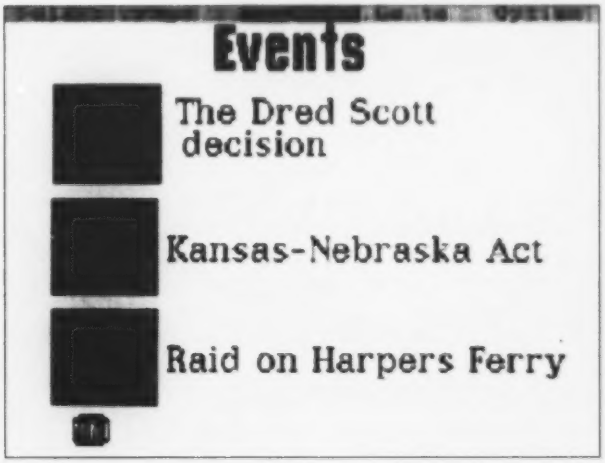
Another snag is animation. Moving objects around the screen does not require as much time as using the animation compiler or full screen layering animation. The former of the two methods, like most animating efforts, requires an extensive amount of drawing that can be time consuming and which can result in the students losing focus on the topic. I would reserve any extensive animation to those students you believe will not lose their focus and who are willing to put in a lot of extra time on their project.

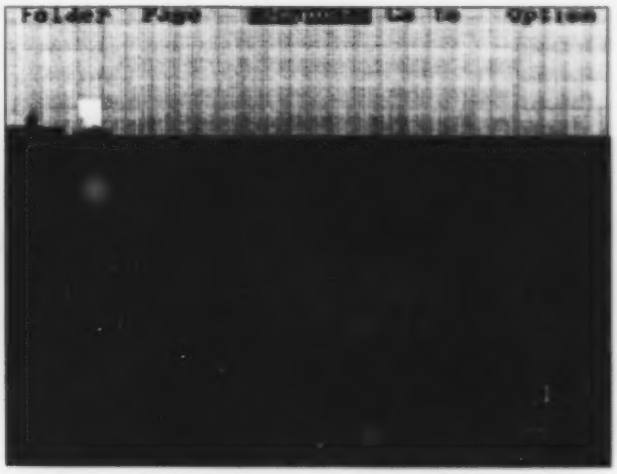
Remember that once the project begins, the teacher becomes the facilitator of content and technical knowledge. Give hypermedia a chance in your classroom and let your students soar!

James W. Beal *has been a junior high computer education and social studies teacher for the past seven years in rural north central Illinois, Dimmick Community Consolidated School, District #175, LaSalle, Illinois. He has also taught computer literacy courses at Illinois Valley Community College and Northern Illinois University. He received his M.S.Ed. in instructional technology at Northern Illinois University, where he is currently enrolled and is pursuing a doctorate in education. E-mail: jimbeal@delphi.com.*


Folder Page Object Go to Option
Main Menu
1. Information on famous people.
2. Information on famous surrender.
3. Graphs, Charts, Maps, and Pictures.
4. Animation on what things were like.
5. Test about the surrender.
6. Instructions on test.
EXIT







Figures 1-8. Examples of cards from the Civil War LinkWay application program.

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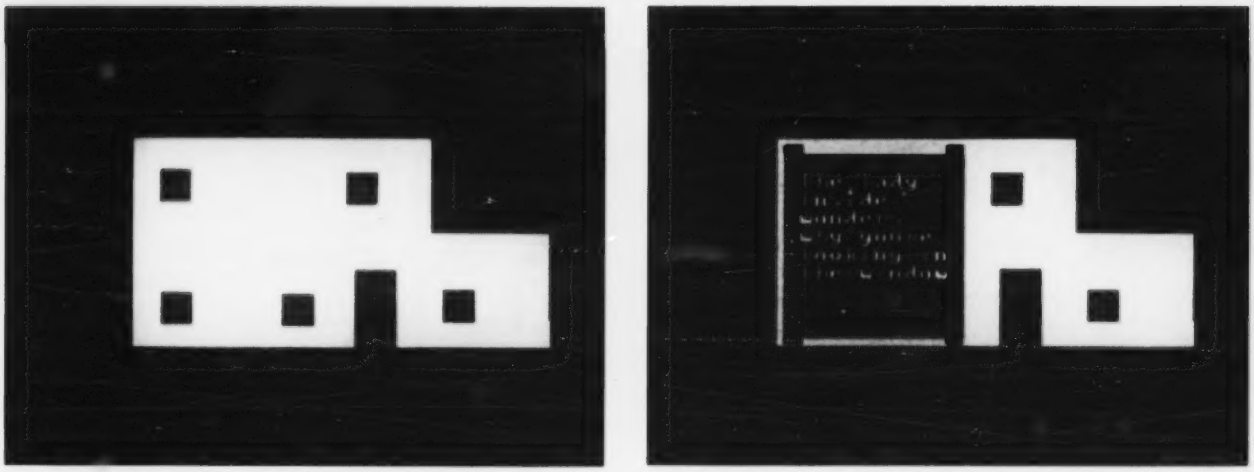

Examples of cards from the Civil War LinkWay *application program.*

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As of November 1, 1995, ISTE's Area Code changed from 503 to 541.

Getting a Grasp with HyperGASP

Paul J. Giguere

Introduction

Since its introduction in 1987, *HyperCard* has become one of the most prominent software products in the history of educational computing technology. With the ability to develop custom software (called stacks) that contain many features found in commercial software products, educators found the ability to develop software specifically for their own classrooms written and designed exactly the way they wanted. The cost to the educators at the time was minimal. *HyperCard* was initially given away with every Macintosh sold (it is now available at an average of $100 through mail order companies) and teachers had to learn new metaphors such as cards, buttons, and fields to construct their stacks. A high-level programming language called HyperTalk had to be learned if you wanted your stacks to perform more sophisticated procedures, but the language was easy to learn because the syntax was familiar and similar to English.

As the years passed and we experienced an increased understanding of the potential impact on learning that computers possessed, teachers began to see new possibilities for learning if they allowed students to construct their own stacks and content rather than developing the stacks themselves. Most students are able to understand the metaphors that *HyperCard* uses. The main problem is the programming language, HyperTalk, which requires students to use symbolic reasoning skills. This prevented younger students from using the full potential of *HyperCard* because they could not master HyperTalk—thus they were limited to developing simple slideshow stacks.

HyperGASP, from Caliban Mindware, is a multimedia development tool which offers Macintosh users the ability to design sophisticated, interactive software and presentations quickly without having to do any programming. It provides a front-end interface that guides teachers, students, and developers through the construction of *HyperCard* stacks.

In the "beginner mode," *HyperGASP* prompts the user for information through the use of dialog boxes on the screen that explain and clarify each new element of the stack as it is created. In the "expert mode," the hand-holding prompts are turned off, allowing more advanced users the option to work as quickly as possible. Placing graphics, images, sounds, QuickTime movies, color, videodisc sequences, and text in a stack is simply a matter pointing and clicking with your mouse.

How Does It Work?

HyperGASP achieves all of this by temporarily attaching two new menus to the standard *HyperCard* menubar which contain all of the features mentioned above.

Figure 1.

As you develop your stack with *HyperGASP*, HyperTalk scripts are automatically written for you and placed in their appropriate places (in stacks, cards, button, or fields). When you are done developing your stack, you can remove (or strip) *HyperGASP* from your stack, thus making it smaller in size. The result is a fully functioning stack that contains features that would have required a very advanced understanding of HyperTalk and would have taken many hours to complete. What follows are brief descriptions of all the major features of *HyperGASP*.

Using HyperGASP

You use the GASP1 and GASP2 menus as you would any *HyperCard* menus. Some of the menu items are also available on a palette. Below is a list of some of the major features of each menu.

Card Maker—This features enables you to select from a list of possible cards to include in your stack. These cards include quiz cards, graphic cards, aside cards, and response cards.

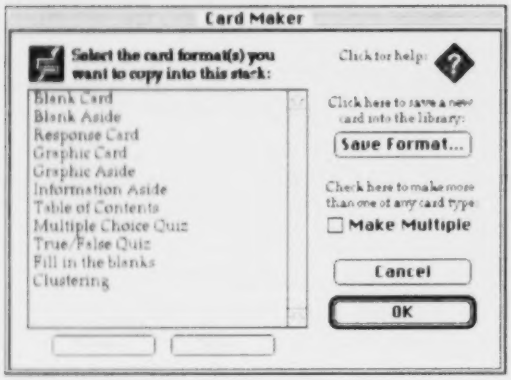

Figure 2.

This feature can help a stack developer maintain a consistent user interface by keeping card elements such as navigational arrows similar. This ultimately makes the stack easier to use.

Button Maker—This feature simplifies the process of creating buttons that are invisible, display pictures or text, play sounds and movies, and perform links to other cards in your stack.

Figure 3.

Field Maker—Using this feature, you can select from a variety of ready-made fields and place them anywhere on a card.

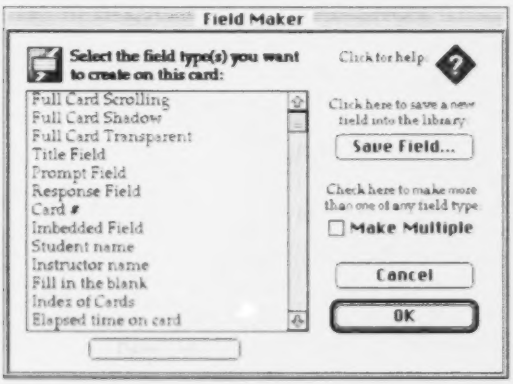

Figure 4.

Pop-up Maker—This powerful feature allows you to make a word or phrase in a field "hot" so that clicking on it will trigger special actions or effects such as pop-up text, sounds and pictures, or transitions to other related cards or material in the stack. This concept is also know as "hypertext."

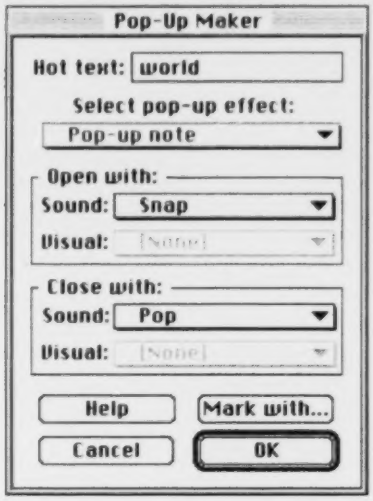

Figure 5.

Other menu items include Button Effect, Field Effect, and Visual Effect makers which make the creation of animated buttons and text, and visual transitions easy to accomplish.

Effects for card button "New Button"
Animated icon
Select one of the effects listed here to animate the button's small graphic icon. You can set the icon to animate either when the button is pointed at, or when the button is clicked
Coin flip
Door
Earth
File cabinet
Flip page forward
Flip page backward
Hammer
Hand wave
Jolly Roger (eyes)
Transfer
Help
Cancel
OK

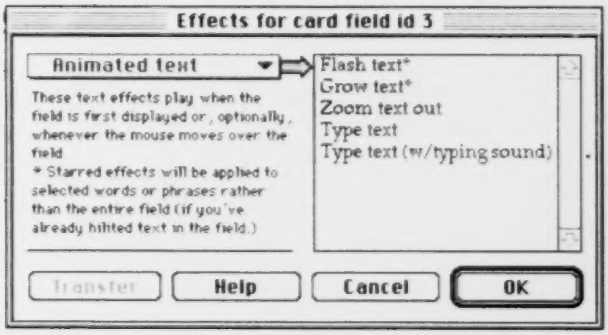
Effects for card field id 3
Animated text
These text effects play when the field is first displayed or, optionally, whenever the mouse moves over the field.
* Starred effects will be applied to selected words or phrases rather than the entire field (if you've already hilited text in the field.)
Flash text*
Grow text*
Zoom text out
Type text
Type text (w/typing sound)
Transfer
Help
Cancel
OK

Figure 6.

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Importing and exporting of text to and from text files is greatly simplified with *HyperGASP* and importing and placing of paint, PICT, 3D textures, and QuickTime files in your stack is now a matter of a few selections with the mouse. There also various utilities available in the *HyperGASP* menus that aid in the actual organization of your stacks so you can see at a glance all of the cards that comprise your stack and reorder them.

HyperGASP Palettes—Two palettes are also available in *HyperGASP*. One is the "HG Tool Palette" which allows you to access some of the more often used features of *HyperGASP* by clicking on icons in the palette rather than selecting the items from the *HyperGASP* menus.

The other palette is called the "HG Color Palette." It is here that you can apply color to your stack coloring buttons, fields, and backgrounds. This accomplished using either a freeware coloring tool called "colorizeHC" (included with *HyperGASP*) or by using Apple's new coloring method "AddColor" (included with *HyperCard 2.2*). When you first create a color stack, you can choose between either method.

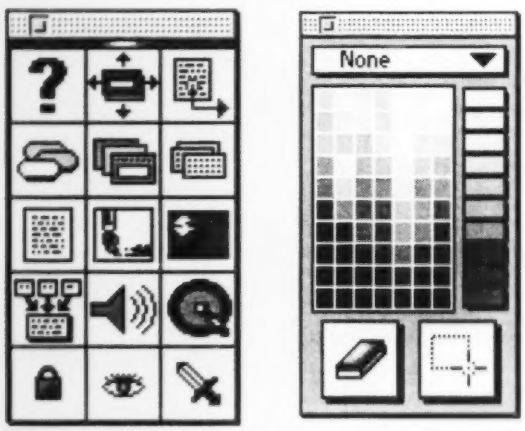

Figure 7.

Requirements

To use *HyperGASP*, you will need the following:

1. Four megabytes of free hard drive space.
2. *HyperCard* version 2.0 or later (2.1 or later with System 7.X
3. Four megabytes of RAM.
4. A color monitor (if color is desired in a stack).

Conclusion

The level of sophistication possible with *HyperGASP* is incredible. Creating great looking stacks in minutes rather than hours is possible without understanding the complexities of *HyperCard* and without having to write a line of HyperTalk code. Your finished stacks (those with *HyperGASP* stripped out) can be distributed to anyone without violating copyright laws. I now use *HyperGASP* as a starting point for all of my *HyperCard* development work. Teachers and students of all ages now have a powerful tool to create stacks they could only dream of before *HyperGASP*.

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School or Building License	$500.00
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Caliban Mindware, 6590 Camino Carreta, Carpinteria, CA 93013; ph. 805/684-7765; Internet: calibanMW@AOL.COM.

Paul J. Giguere, *17-3 Garden Circle, Waltham, MA 02154; ph. 617/899-8402; PGIGUERE@EDC.ORG.*

Authoring Systems and Constructivist Learning

Trudy Abramson

Introduction

In the Fall/Winter 1994-95 issue of *HyperNexus*, I introduced a series of tutorials that provide an easy introduction to authoring with *HyperCard*. These tutorials were prepared as a first assignment in a graduate course in hypermedia programming on the Mac. The objective was to create a model stack that could be taught to other teachers in a single technology inservice session. Because the participants in the course taught a wide range of grades and ability levels, there is an interesting difference in their approaches to the assignment.

The Tutorials

The first tutorial presented last issue was written by Jan Borda and Saundra Josipowich. Its menu is a food pyramid. Each of the three layers of the pyramid is surrounded by an invisible button that, when clicked on, takes the user to a pertinent screen. This issue's entry, written by Carol Caffery and Kim Lui, is also truly elegant in its simplicity. The contents screen has five numbers, each in a different shape. This stack was written with a double purpose: first, to fulfill the assignment of preparing a stack with undemanding content; and second, to serve as a learning tool in an early childhood setting.

Approaches to Presentation/Project Development

One of the ongoing discussion issues among professors of educational technology is whether it is possible (or preferable) to master the tools of an authoring system at the same time one is gathering the content for a hypermedia/multimedia report. This question becomes particularly significant in a constructivist learning environment. There are at least three separately identifiable components in the authoring process: mastery of the programming tools, gathering and learning the content, and instructional design and development. Middle and secondary school student-authors' efforts might be divided into tool mastery and content presentation using greatly informal instructional design.

At the present time, I am teaching Authoring Systems and Courseware Design and Development in a doctoral program in Computing Technology in Education that contains eight required courses. The content expertise must be gathered by the doctoral student without instructor guidance; the new learning, taken one six-month course at a time, involves mastery of authoring systems (many systems, many platforms, many tools) followed by an in-depth mastery and implementation of the instructional design process. I would be pleased to discuss either course and/or student work therein if there is an interest expressed by the readership.

A very respected colleague is in complete disagreement. She maintains that it is a much better use of classroom time to master authoring tools on an as-needed basis and immediately apply the tools to a constructivist learning project. What do you think? What have you tried? How would you go about it next time?

Invitation to Participate

I ask each of you to send *HyperNexus* an anecdotal account of how things work in your school. Is there a nine-week technology course followed by constructivist project development in a subject-area class? Does the social studies teacher, like Jim Beal in the featured article, teach *LinkWay* alongside the content areas? Is there an assumption that the tools are so transparent

that no special time is needed for mastery? If yes, how does this play out in reality? Do teachers stay after school to get students up to speed on authoring tools? It is very important to the future of technology in education that we disseminate our experiences. Write an article, write a letter, or send screen dumps with Post-It notes attached and *I'll* write the article. We need to let the greater educational community know that hypermedia and multimedia in education are becoming the rule, not the exception.

As you work through Carol Caffery and Kim Lui's tutorial, think about these things. First, how could you use this tool to enhance your classroom presentation? Second, how could your students use this tool to raise the level of subject mastery? Third, how could a simple hypermedia tool, such as this, be used to increase attention span or frustration tolerance? Send us your solutions.

Trudy Abramson *is a professor at the School of Computer and Information Sciences, Nova Southeastern University, 3100 SW 9th Avenue, Fort Lauderdale FL 33315; ph. 305/423-1211; abramson@alpha.acast.nova.edu.*

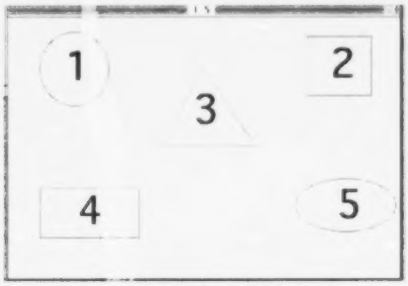
Instructions for HyperCard "1-to-5"

Carol Caffery and Kim Lui

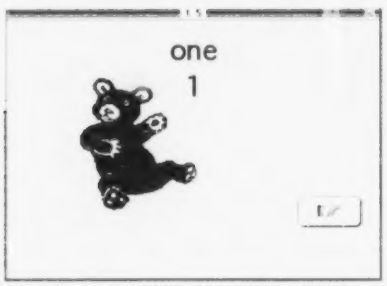
1. Make a new stack by pulling down the File Menu and select the New Stack Option. Name the stack "1-to-5."

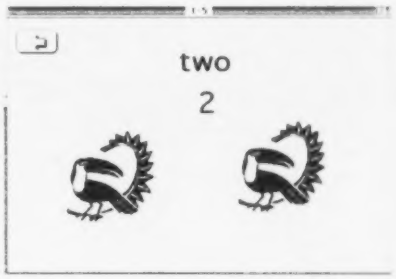
2. Tear off the Tools Menu and place it to the right of the screen. Double click on A. Select Bold/Geneva/size 50 and click OK. Type the numerals 1, 2, 3, 4, and 5 on the page. Use the Tool Menu to create shapes around the numbers. (Circle, square, triangle, rectangle, and oval.)

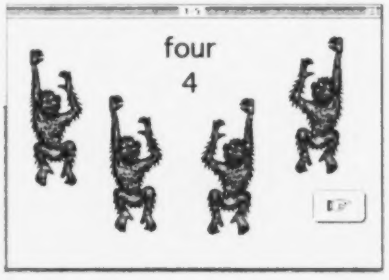
3. Create buttons on the numbered shapes to bridge them to a corresponding card. To do this, select Button on the Tools Pallette located on the top row center. Select New Button under the Objects Menu. New Button will appear on the screen. Move and resize the button to its desired location and size. Place the button over one of your created numbers within a shape. Double click on the created button. A screen will appear giving you selections as to the style (use transparent), the effect, and the speed of the button. Once your selections have been completed, double-click on your newly made button to use the Link command that will provide you with linking options. A small panel appears with linking choices. Make a new card by selecting New Card under Edit Menu. Now select "this card" from the linking panel. Immediately, the screen goes back to the original card. Use the browsing tool (pointing finger on upper left corner of tool palette) to test your new button. Press on the button and you will go to your new card.

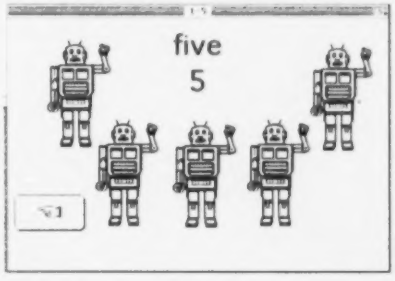


Cover Card—1-5 Stack.







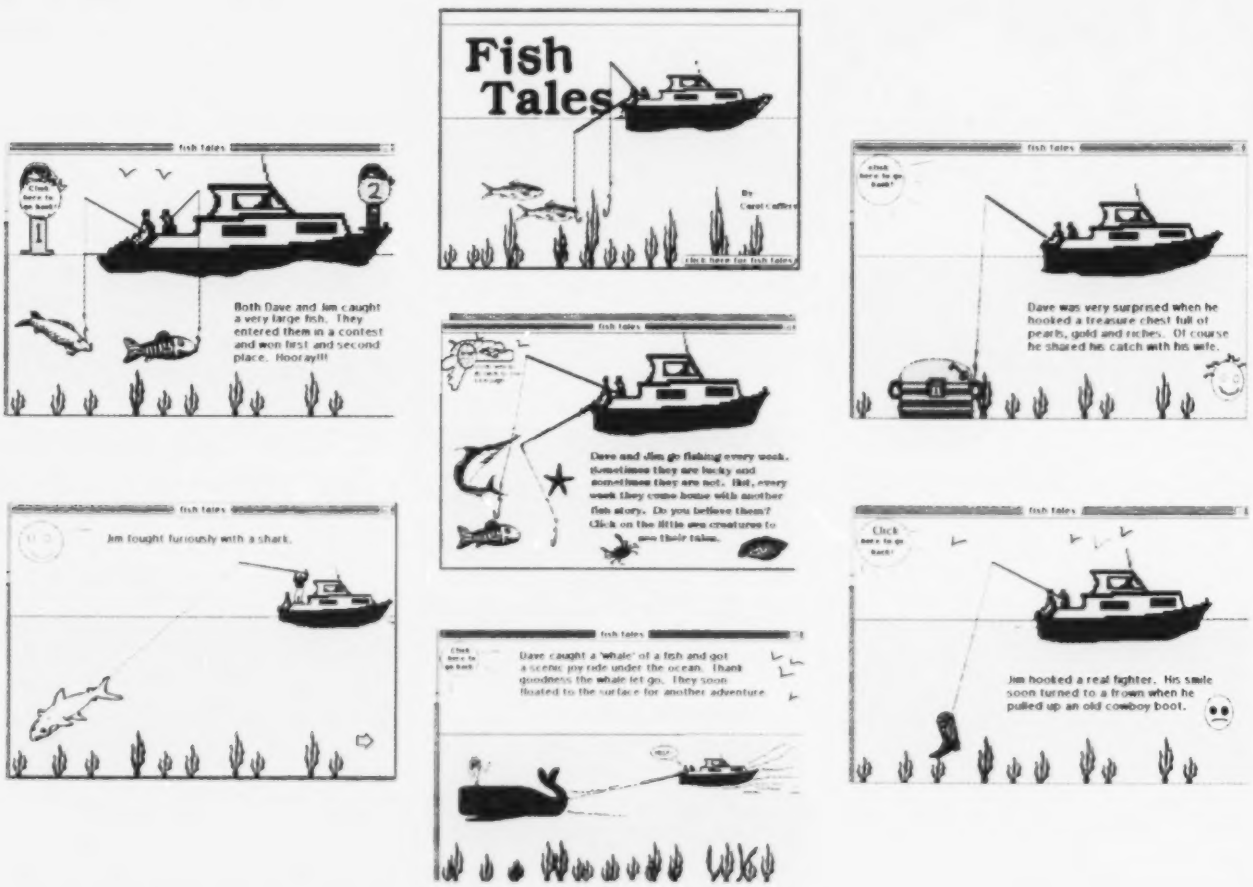


4. On your new card you can create pictures, write script, and create buttons. The pictures can be made by using the Tool Palette or by using prepared graphics from *Art Bits*. To import graphics, select Open Stack on the File Menu. Select *Art Bits* and open that file. Make a selection as seen fit for creating your card.
   a. Locate desired graphic. Click on Lasso from the tool palette and circle the picture. Copy the graphic by using Command-C.
   b. Select Recent under the Go Menu and locate the desired card from which you were working. Click on it to return to that card.
   c. Use Command-V to paste the graphic on your page. You can change the size of the graphic by using the Apple Key and the mouse to pull on the sides of the pictures. To make multiple pictures, use the Option Key and the mouse. We created the number of objects that corresponded to our activity.
   d. To create text, click on the A from the Tools Palette. Double click to select the font, size, and style of the text desired. We typed the numeral and then wrote out the number as shown in Figure 4.

5. A button can be created at this point to connect to a new card or to go back to the original card. We went back to our original numbered card. Follow the directions for creating a button. (Click on New Button under the Objects Menu. Click on the button. Make selections. (We used an arrow icon on this page.) Locate button where desired. Select "link to." Use Recent under the Go Menu to locate your first card. Select that card. Click on "this card" from the linking panel. Then try out your button).

6. Continue the same procedure connecting each number with a card giving an example of the number, the numeral, and the quantity the number represents.

Carol Caffery and Kim Lui wrote this article as graduate students at William Paterson College of New Jersey, Wayne, NJ 07470. They may be reached care of Dr. Millie Dougherty at the School of Education.


Fish Tales
Both Dave and Jim caught a very large fish. They entered them in a contest and won first and second place. Hooray!!!
Dave and Jim go fishing every week. Sometimes they are lucky and sometimes they are not. But, every week they come home with another fish story. Do you believe them? Click on the little sea creatures to see their tales.
Dave was very surprised when he hooked a treasure chest full of pearls, gold and riches. Of course he shared his catch with his wife.
Jim fought furiously with a shark.
Dave caught a "whale" of a fish and got a scenic joy ride under the ocean. Thank goodness the whale let go. They soon floated to the surface for another adventure.
Jim hooked a real fighter. His smile soon turned to a frown when he pulled up an old cowboy boot.

Stack 2. Another example of a simple stack is "Fish Tales," above.

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ARIST—A Hypertext System

Bernard Paul Sypniewski

Abstract

This article describes *ARIST*, a hypertext system written to provide my Introduction to Logic class with some historical background to *ARIST*otle, the father of logic. It was written with the HyperTIES authoring system. In its first version, *ARIST* is a hypertext system written for students in an Introduction to Logic class in a community college which places *ARIST*otle, the father of logic, in historical perspective. *ARIST* is designed to be usable in several courses, including Heritage of the Western World and Introduction to Philosophy as well as Introduction to Logic. *ARIST* was written with the *HyperTIES* authoring system, manufactured by COGNETICS.

HyperTIES produces DOS-based hypertext systems, even though a *Windows* version is currently in testing. *ARIST* only uses *HyperTIES* hypertext capabilities. Perhaps in the future, *ARIST* will take advantage of HyperTIES ability to link sound files into a hypertext system. *HyperTIES*, which I reviewed for HyperNexus last year, quickly produces finished products; once the user learns a few basic skills, he or she is largely freed from technical concerns. *HyperTIES'* simplicity allows the author to concentrate on the content of the system rather than on production concerns.

ARIST combines some graphics in its text but remains primarily a text based system. Graphics are easy to introduce into a *HyperTIES* program; the reason for the limited use of graphics is that graphics easily overwhelm text. They are used to highlight and supplement the contents of the text rather than as a primary means of delivering information. Figure 1 shows *ARIST'S* opening screen.

It contains a text/graphics area within a grey frame. There is one link on the text area and two on the frame. While such screens can be criticized for lack of "pizzazz," they quickly focus the user's intention to the important points of the message: the title and the links. *HyperTIES* encourages clean screens but permits as much clutter as the author wants. Figure 1 shows many of *HyperTIES'* "canned" elements. While the author can use various backgrounds, colors, and so on. *HyperTIES* provides a few stock frames, buttons, and basic screen elements. For most purposes, they are satisfactory, if less than dramatic. "Satisfactory" saves much development time. I estimate that 90- 95% of *ARIST'S* development time went into the content of the system rather than into system development.

HyperTIES is designed around the idea of an encyclopedia (TIES stands for The Interactive Encyclopedia System). The author writes articles that contain links to other articles or short notes. *HyperTIES* provides search, indexing, and printing capabilities as part of the package. An individual screen contains a fairly small piece of text. If you use a large font size the way I did, a screen will never contain more than about a half of a typewritten text. Graphics, of course, reduce the amount of text still further. Figure 2 shows a typical page containing a fairly small (2x2 inches) graphic. The page contains one link.

Notice that the page has a title ("Assos" —the name of a town), a text/graphics area, and frame like Figure 1, as well as some navigation buttons. There is one link to another article.

To show *ARIST'S* linking strategy, look at the introduction. It mentions that *ARIST*otle taught in Athens. The word "Ath-

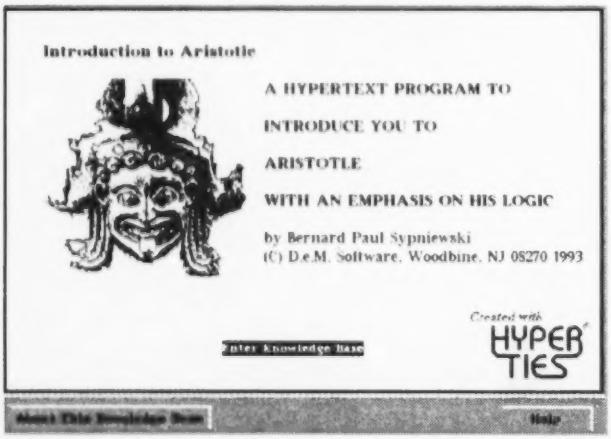

Figure 1. Opening Screen

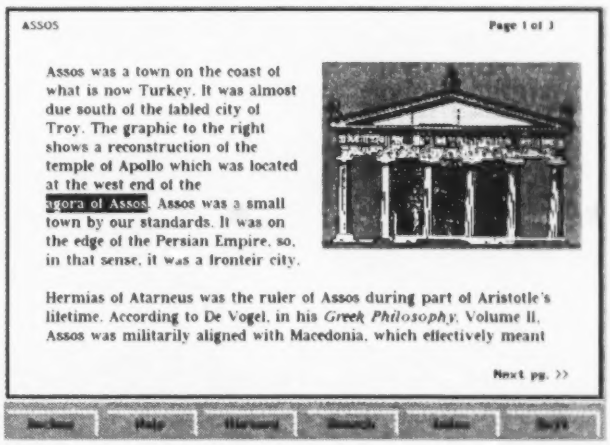
ASSOS
Page 1 of 3
Assos was a town on the coast of what is now Turkey. It was almost due south of the fabled city of Troy. The graphic to the right shows a reconstruction of the temple of Apollo which was located at the west end of the agora of Assos. Assos was a small town by our standards. It was on the edge of the Persian Empire, so, in that sense, it was a fronteir city.
Hermias of Atarneus was the ruler of Assos during part of Aristotle's liletime. According to De Vogel, in his Greek Philosophy, Volume II, Assos was militarily aligned with Macedonia, which effectively meant
Next pg. >>

Figure 2.

ens" is linked to a description of the city in ancient times. The article on Athens mentions the Athenian Acropolis. The word "acropolis" is linked to an article which describes it. The article on the Athens mentions a building called the Erectheum, one of the temples located on the Acropolis. The article on the Erectheum has a graphic showing the famous Porch of the Maidens. An article on the Porch of the Maidens contains a link with the text "turned to stone," which links to Agraulos. Agraulos and her sisters were turned to stone because they refused the advances of one or more gods; the Maidens which hold up the roof of the Porch on the Erectheum celebrate these ladies. These two links discuss these and other legends of the Acropolis. The "turned to stone" link is targeted to information which is not pertinent to the main point of the overall hypertext system but yet may be interesting to its users. The Erechtheum's Porch of the Maidens is supported by columns shaped like young women. While the reason for the Erectheum's having columns in this shape is not relevant to the study or understanding of logic, it does highlight an aspect of the Greek mind and Greek creativity.

A user who saw the graphic of the Porch of the Maidens might ask why caryatids (columns in the shape of women) were used in place of the more traditional Ionic columns. By anticipating and answering a question of this sort, the author rewards the reader's curiosity and encourages the reader to remain curious. Stimulating curiosity assures that the system will be used. Stimulating curiosity without satisfying it encourages a reader go outside the system for information. Once outside the system, the reader might not come back.

Figure 2 is a page in a secondary article. It describes a small town in Turkey where *ARIST*otle once lived. The reader came to it from a brief biography of *ARIST*otle; the Assos article leads further to the discussion of Greek provincial towns. The Assos article was included in *ARIST* to satisfy the reader's curiosity. *ARIST* is primarily a system designed to stimulate the reader's curiosity. There are other ways of designing hypertext systems.

Menu Method

Any hypertext system can be seen as a large, free-format menu, with the links being menu choices. A menu system might have an introduction containing links to the "main" articles. Each "main" article may have a menu to "main" sub-articles, and so on. A menu system is essentially a shunting system, getting the reader to articles by assuming which the reader knows what articles to read. While articles may have embedded links which trigger definitions of terms, graphics, multi-media effects, and the like, a menu system is designed to be a more or less complicated index.

Hub And Spokes Method

A hypertext system can be seen as having several "centers" or "hubs" with each hub having one or more "spokes." The "mapping" concept that many educators are familiar with fits naturally into a hub and spoke system. The hubs are the most important points in the system with spokes leading to interesting but peripheral material. A system which talks about Baroque art and music might have hubs for painting, architecture, and music. The music hub might have spokes which lead to biographies of the great Baroque composers, such as Bach and Handel. Other spokes might trigger excerpts from sonatas or fugues. Still others might define the notion of "musical architecture". These spokes would be accessed from the music hub rather than the art hub. In the menu method, an introductory article would contain links to ART, ARCHITECTURE, and MUSIC. Accessing the MUSIC link would display another article with links like LIFE OF BACH, LIFE OF HANDEL, HEAR A SONATA, and so forth. A hub and spoke system can be seen as a limited menu system. Rather than having being one main menu, there are as many menus as there are hubs.

The Exploration Method

The reader's curiosity will play a large part in navigating an exploration system. The reader is given no prompts other than an occasional reference in the text and the sofytware's built-in aids to navigation to assist the user in moving around the system. In a highly complicated system, the user might lose track of where he or she is. The browser system must be robust for this system to work efficiently. This method permits learning by discovery, but also gives the least help to the reader. While there must be some introduction to the system (you've got to start somewhere), it need not be extensive.

Comparisons of the Systems

A menu system will probably get a reader to a desired article the most quickly, but will provide the least opportunity for the reader to see connections between ideas. Before beginning construction of a menu system, the author should first ask whether a hypertext system is really appropriate. Why not use a database management system, like dBASE or Q&A? What will a hypertext system arranged as a menu system provide the reader that a database system won't? Hypertext is confusing depending on the reader's personality. Some people like to rummage around; some don't. For those that don't, a hypertext organized this way might provide a disincentive to learning. An exploration system is the easiest to implement but may be the hardest to design well. Linking or creating articles without much thought leads to a "spaghetti" system. Presenting the reader with an amorphous mass of material which is vaguely linked is a disservice. On the other hand, a system which is too predictable loses much of the joy of discovery. Exploration systems are not always easy to develop. There is a tendency, especially in an easy to use authoring system like *HyperTIES*, to start typing, linking merrily as you go. A properly developed system demands more than that. There should be some plan, even though the plan need not be obvious or highly detailed. The plan must define an end point. It is surprising how difficult finding a good beginning and end can be. To a large degree, the selection of these points determines the usability of the system. Too much information is worse than not enough. Information overload in a spaghetti-like system leads to confusion—not education. Fortunately, reasonably planned hypertext systems

are usually easy to extend. *ARIST* can be expanded in several directions: it can be linked to programs with logic exercises; it can contain the actual texts of the Organon (the collection of *ARIST*otle's works on logic); maps could be included; perhaps a comparison between *ARIST*otle and Plato would prove useful; I have always been tempted by an extension into rhetoric. Because of the way *ARIST* was developed and because of *HyperTIES'* ease of use, these or other extensions are relatively easy to implement.

What method should the author choose? Some hypertext subjects suggest an organizational method; others do not. Some audiences might be better served by one method than another. Readers with little computer experience would be better served by a system with many, simple prompts; a menu system might be appropriate. A system designed for discovery learning or browsing might work better in a hub and spoke or exploration system. The audience should be the deciding factor.

With more and more texts being made available via the Internet, teachers may wish to create on line textbooks. If a class studied a particular book or a historical text, like the Declaration of Independence, the teacher or the class might wish to turn the text into a hypertext system. A simple to use authoring system would permit a class to work on a text over the school year and add notes, graphics, and other elements it might find interesting to a text that might otherwise prove a chore to study. If enough disk space were available, such a project could involve classes over a period of years, who could add or delete material as they wished. Perhaps a class library could be started this way. Annotating course material with a hypertext system might just stimulate student's willingness to read.

Product/Author Information

For those who are interested, *ARIST* is available for the cost of duplication. It requires a 386 or better DOS-based computer, with or without *Windows*, a VGA screen, with an optional mouse. Inquiries or comments should preferably be made via e-mail at bpsyp@delphi.com. Snail Mail address: **Bernard Paul Sypniewski**, RD Box 2, Woodbine, NJ 08270.

HyperTIES is manufactured by COGNETICS, 51 Everett Drive, Suite 103B, Princeton Junction, NJ 08550; ph. 609/799-5005.

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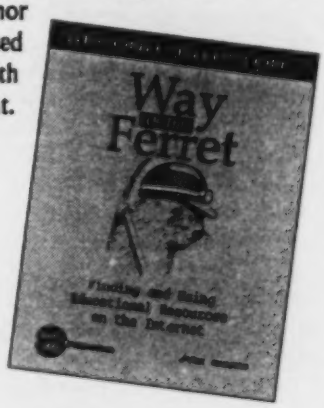

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Short Motion Picture Sequences in Multimedia Design

Gary Ferrington

When most of us think about motion pictures, we envision sitting in a comfortable theater with surround sound, or at home watching a favorite television program. Educators may think about the use of films or videos for classroom use, but few have yet to think about the potential of moving imagery in computer-managed multimedia.

The compact disc is providing instructional designers with a new multimedia format for the delivery of educational material. Two different disc formats have emerged. The CD-I (Compact Disc Interactive) is similar to the popular videodisc in that one simply inserts the disc into a special player and navigates through the on-screen information using a hand held remote control. This format is appropriate where keyboard input is not required.

The CD-ROM (Compact Disc Read Only Memory) allows for additional interaction in that program navigation is controlled by a computer keyboard and mouse. This format is becoming common as many PC and Macintosh computers now include a built-in CD-ROM system.

Most educational compact discs are primarily text based, or use a combination of text with limited sound, still pictures, and moving imagery. Improvements in compression technology will eventually expand video and interactive capabilities. These improvements will make possible the revival of a valuable instructional resource once lost as the use of classroom films were replaced by video cassettes.

Instructional media producers, during the mid-1960s, were actively involved in the design of self-contained 8 mm film loop cartridges. These short films were played in small portable projectors that students could plug in and use most anywhere. Hundreds of titles were produced. Films ranged in from a few seconds to two or three minutes in length. The term "concept film" was popular, in that the film loop could be repeatedly played illustrating a single idea such as the combustion process within an automobile engine. These film loops were silent and required careful visual planning and production in order to effectively communicate the concepts being presented. Student observational skills were enhanced in using these educational materials.

Most concept films were designed and marketed to be an instructional film database. A school could purchase, for example, a complete set of films illustrating basic principles in physics, or a set of films related to track and field skill development. Sometimes individual titles were produced that were related to a specific curricular area. Students were encouraged to use the material as needed. The ease of use made student access possible anywhere and at anytime.

The author made effective use of cartridge films in a basic educational media course. Work stations in the media lab were equipped with projectors and selected film cartridges. Students could independently learn how to operate a slide projector, drymount and laminate an instructional graphic, or use specific lettering tools. These were very effective because they were well designed and structured to teach a process within a short period of time.

Unfortunately, film loops were easily worn by extensive use and poorly maintained equipment. The introduction of the videotape cassette quickly changed the market for the distribution of motion picture material, and short film segments did not fit the new format. Though some schools still use loop films, commercial titles are no longer produced. The emergence of CDI and CD-ROM technology provides the opportunity to reevaluate the value of the short motion picture sequence as an instructional resource.

Instructional designers will soon be able to store many minutes of full motion video with sound on a compact disc. This technological advancement will make possible the generation and compilation of short instructional video sequences onto a single disc. These videos will be easily accessible by a student using a remote control or computer keyboard.

Many of the original educational applications of the cartridge loop film remain appropriate today and are even more practical given the state of digital technology. Here are some example uses.

Single Concept Sequences

Short motion picture sequences may be used to illustrate a single concept such as a rule, process, or to visualize of a single event that takes place over a given period of time. Special cinemagraphic techniques help make these concepts more understandable to students.

- High-speed cinematography records events at several hundred film frames per second. The explosive force of a bullet shot through an apple, for example, can be played back at a normal frame rate resulting in a slow motion picture sequence of the event. Lightening and other natural or human made events which happen at great speed can be captured and played at a frame rate which allows for easy study of a concept or event.
- Time-lapse cinematography records events that occur over a long period of time. The camera is on a timer set for activation every so many minutes or hours. The camera records a few frames and then waits until it is time to record again. The results, when played at a normal frame rate, provides the illusion of a flower bud, clouds forming

a storm, or water freezing into ice. Time-lapse cinematography condenses time, whereas high-speed cinematography expands time.

- Animation provides the designer with the opportunity to illustrate concepts which are not easily presented with actual cinematography. The operation of a steam engine would best be presented in an animated film sequence. The respiratory, digestive, or circulatory systems could be more easily presented with a motion diagram. Animation is an effective way in which to present phenomena. The rotation of the earth, solar eclipse, cell division, or other situations in which moving illustrations are appropriate can be effectively taught through animation.

The CD-ROM format allows the user to freeze a specific frame for study. This overcomes the problem 8mm cartridge film users once had when the still frame would burn from heat generated by the projection lamp. And, as with any CD player, the disc can be advanced forward or backward to repeat specific sections of the film sequence.

Process Instruction

The mastery of those processes which require step by step instruction is facilitated by viewing short repetitive motion picture sequences.

- Shop class instruction can be enhanced through the use of specific step by step instructional materials. The operation of a drill press, for example, is filmed from the user's point of view as the skill is demonstrated in a logical sequence. Other process instruction such as the proper technique for needle injection as part of a nursing program, and the use of a thermal copier for preparing overhead transparencies, would be two other examples.
- The development of motor skill techniques often includes the observation of experts. Specific swimming strokes, javelin throwing techniques, appropriate golf swings, the use of a pen in developing calligraphy skills, or learning American sign language, illustrate the use of motion image sequences for modeling skills.

Mini-Documentaries

Mini-documentaries are much shorter in length than traditional half-hour or longer films. They are brief and may last just a minute or two in length. Such films are used to make observations of natural, social, or scientific events. Mini-documentaries might be used to observe cultural activities such as: a Swedish folk dance, a religious baptism, the carving of an African mask, or the making of an Indian canoe. A compilation of mini films might form a visual encyclopedia of a culture on disc.

Motivational Imagery

Moving images can serve as a motivational stimulus to writing, art, or music composition. A sequence showing falling autumn leaves, the flowing of water from rain to river and out into the ocean, or the imagery created by the movement of the wind through trees and over sand dunes provide a stimulus for creative writing or art activities. Motivational material is experiential and requires the user to observe using both the sense of sight and hearing. There are many excellent existing short films which could be collected on disc and used to stimulate thought and activity in many different curricular areas.

Story Videos

A short story with or without a resolution is a concept instructional designers might consider. Unfinished stories provide students with the opportunity to generate their own story resolutions. Completed stories may be used in a variety of ways. They may provide personal enjoyment and entertainment, or they may be integrated into an instructional context. For example, a unit on friction might include a short story about friends learning to rollerblade and discovering the basic principles of physics that are involved.

This article has revisited a technology of instruction that once proved to be extremely useful until the introduction of the VHS video cassette. The cassette format did not facilitate the use of short film segments and the use of this instructional strategy was lost. Now, the CDI or CD-ROM promises a revival of brief film material in classroom learning. Hopefully designers will review the genre of the 8mm loop film and realize its potential in the multimedia format of the future.

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Interactivity: A Cognitive Humanistic Model

Don Hall

Abstract

This paper will use an informal conversation model to describe the critical elements of interactivity and the impact for multimedia design. The human interactive process is analyzed and translated to a modified mechanistic interaction between computer and the user.

Introduction

Will the time come when the technology tools of humanity assume their own level of humanity whether simulated or actual? We dream of being able to discourse and interact with technology in a fashion that expedites the exchange of information and mirrors the conversational processes of human communication. Yet what are the elements necessary for this type of interaction to occur? For that matter, what is interactivity itself?

Interactivity as a Process

What is interactivity? *Webster's New Collegiate Dictionary* defines it as "the process of acting upon one another." Generally, we define interactivity, as it relates to technology, as the user engaging in direct and continual two-way communication with the computer, responding to questions and receiving feedback in reaction to answers provided (Lockard, 1987). In other words, the computer learner must be an active participant in the learning process.

Yet to understand any process, one must also analyze the components of the process. Discrete elements compose the textual fabric of the interactive process. We will address these from a broad conceptual perspective and also relate the application of these to multimedia technologies.

The Beginning: Purpose and Procedure

First, there must be a purpose for the interaction. In order for meaningful interaction to occur there must be at least two participants who believe there is something to be gained from their interaction. This is less true when the interaction occurs with inanimate objects such as computers. The recognition of mutual beneficence is not a prerequisite since only one party is probably gaining benefit. This beneficial purpose is critical to getting someone to initially interact with a multimedia system. This initial interaction may be a response to curiosity (you see it and think it is interesting), informed inquiry (somehow you know there is some useful information there), or through coercion (you were told you had to use it).

After the encounter is initiated, it is critical that there is a mutually acceptable process for transferring information between the participants. In the case of human interaction this could be through verbal or non-verbal means (written dialogue, body/sign language, etc.).With technology, the interface serves as this crucial link. If the computer asks for input in a manner the user does not understand then the interaction will not occur. Concurrently, it the user tries to query the computer in a manner it has not been programmed for then the desired interaction may not occur. One way to facilitate this interaction is to avoid this *acausality*. That is, make the activity of the system a clear consequence of the user's actions. (Gaines, 1981)

Control

Once the protocol for information exchange is established then the issue of "control" and "turn-taking" develops. In the human interaction model, the participants have choices as to how to respond to each other. They can lead, follow, or mutually steer the conversation. The signals to relinquish their control of the conversation is rather informal. In most situations there is not a "formal" sign to release "your turn." This control is also dependent upon several external variables including personality, social setting, authority/status, prior level of established relationship (formal or informal).

With the computer, the level of control and method for relinquishing has been predetermined by the programming of the computer system. Depending on the nature of the program, it can allow for full user control to facilitate user driven inquiry and manipulation. The technology can also dictate that the computer controls the pace and direction of the interaction. (Although one could easily question whether this model is true interaction.) A third level lies between these extremes, facilitated inquiry. The user and the computer interact based upon the user request and the computer monitors and guides the user in their inquiry. This is a difficult balance to achieve.

Feedback

Each party also is involved in a feedback loop. As human interaction continues, there is an ongoing feedback and monitoring process occurring. If the participants reach a termination point, the interaction may end. The termination point may be that one or both parties have achieved their desired purpose for initiating the interaction. It may be the converse as well, they failed to achieve this purpose. This feedback loop is used for determining if continued interaction is desired or needed; however, it also serves the purpose of guiding the interactive process itself. With multimedia systems, the concept of feedback must be addressed during the design phase to increase

the usability and likelihood of the program being used. For example, the user may end the interaction at any point due to frustration in successfully navigating the program, loss of interest in the program, or other unknown reasons.

Potential Problems

The program designer must anticipate the issues of frustration and loss of interest incorporating processes to reduce the possibility of these outcomes.

The first issue, the frustration of the user in navigating the program, can be dealt with in part by practical design considerations for the interface such as uniformity and consistency in screen element and operations; provide a reset command (interruptibility); provide a "backtrack" facility or alternative path option (digression); minimize human memory demands; provide adequate prompts and help;and keep the program simple. (Gaines, 1981), (Simpson, 1982) The second issue, loss of interest in the program, can be minimized by observing the principles outlined in the writings of Thomas Malone. Malone describes three attributes that are linked to intrinsic motivation: challenge, fantasy, and curiosity. (Malone, 1981) Addressing these attributes in the program design phase can increase the probability that the program will be used on a reoccurring basis.

As in any system, there are unique limitations inherent that must be considered in analyzing the process. There must be a common vocabulary present for the participants to successfully express their ideas. If either party does not understand the syntax or content then the intent will be lost as well if the interaction can even occur at all. There may be differences in learning curves which relate impact the rate or complexities of responses.

If either party in a human interaction is vastly superior to another whether cognitively or developmentally, there must be some special accommodations made in order for the interchange to continue successfully. Several strategies include slowing the pace of the interchanges; reframing the conversation to try to reestablish commonality; and decreasing the volume and depth of information exchanged. With a user and computer, the same strategies apply but the computer must have these alternatives preprogrammed in order for them to be available. Again, there must be some type of feedback system present to determine when these measures should be initiated. In a personal interaction, the parties involved can determine this by observing body language, voice inflection and tone, etc. However, with the computer and user, this is not the case since the computer may not know when or how to begin them. If some accommodation is not provide once the user's frustration level is reached, the interaction will cease because the user will terminate the interaction.

Communication and interaction are complex processes which are supported by the presence of certain discrete skills. They are just as easily hindered by the absence of these skills. Understanding the process is just the first step in building an interactive model which can effectively mimic the human to human interactive thinking and learning process. However, until technology can assimilate the full scope of human cognition with all its subtleties, this interaction between human and machine will be just a simulation of the "real thing."

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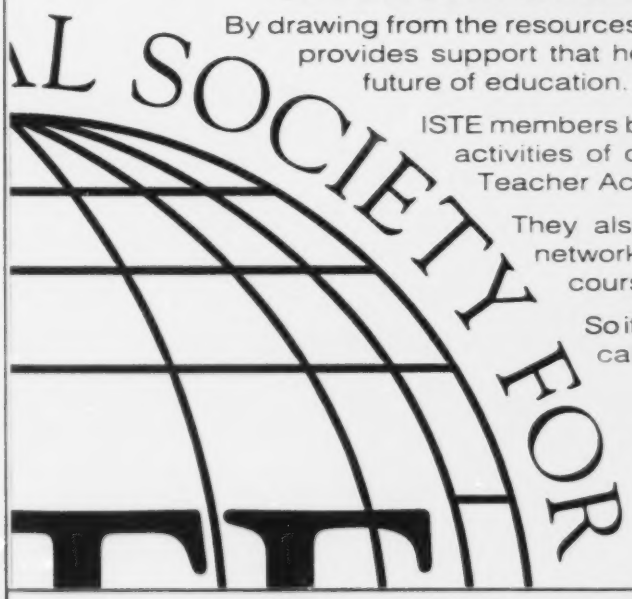

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